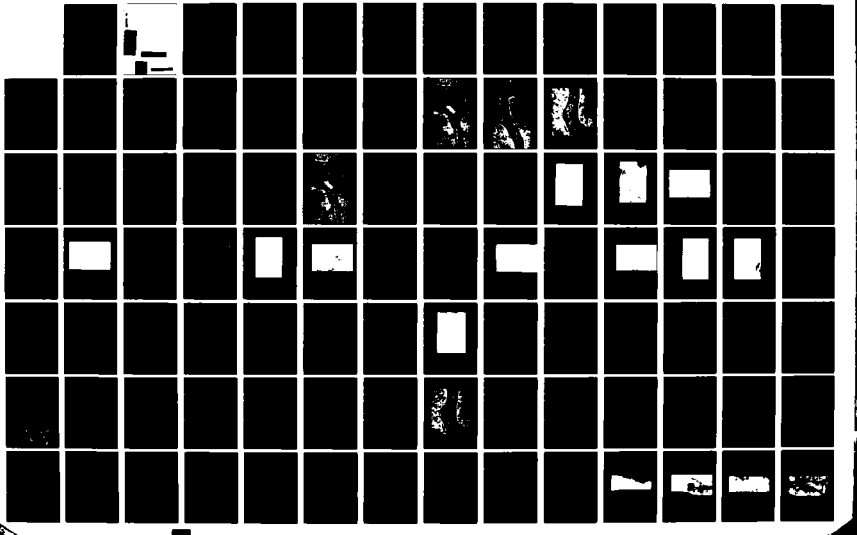
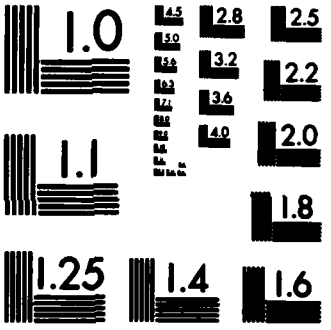
AD-A120 626 PRELIMINARY CULTURAL RESOURCE SURVEY AND GEOMORPHOLOGICAL ASSESSMENT OF S..(U) ILLINOIS STATE UNIV NORMAL MIDWESTERN ARCHEOLOGICAL RESEARCH C.. 1/2

UNCLASSIFIED M L BARNHARDT ET AL. JUN 82 F/G 5/6 NL





During 1932 and 1933, archeologists from the University of Chicago conducted an archeological survey of Rock Island County. Survey techniques included informant contact and pedestrian survey. The surveyors recorded a number of sites along the bluff tops and on terraces near the bluff base just outside the Pool 16 survey area (Harrington 1933). In 1974 the Pool 16 area was visited by a survey crew from the University of Wisconsin-Milwaukee in conjunction with the Illinois Historic Sites Survey. They recorded several sites in the Mississippi River floodplain just outside the project

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

(2)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A130 626 / 3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) PRELIMINARY CULTURAL RESOURCE SURVEY AND GEOMORPHOLOGICAL ASSESSMENT OF SELECTED AREAS IN NAVIGATION POOL 16, MISSISSIPPI RIVER	5. TYPE OF REPORT & PERIOD COVERED FINAL / 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Edward B Jelks & David L. Carlson eds., Michael L. Barnhardt, David C. Dycus, Edward B. Jelks, Frederick W. Lange, Floyd R. Mansberger, Joseph S. Phillippe, Frederick S. Thomas	8. CONTRACT OR GRANT NUMBER(s) DACW25-81-C-0046
9. PERFORMING ORGANIZATION NAME AND ADDRESS Illinois State University, Midwestern Archeological Research Center, Normal, IL. 61761	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Corps of Engineers, Rock Island District NCRED-PE, Clocktower Building, Rock Island, IL. 61201	12. REPORT DATE June 1982 / 13. NUMBER OF PAGES 175 (In vol. I)
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) N/A	15. SECURITY CLASS. (of this report) UNCLASSIFIED / 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)
UNLIMITED for Volume I, Volume II contains exact site locations and is only available through Originating Office (Attn: NCRED-PE) or from the contractor.

[illegible] Approved [illegible]

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)
UNLIMITED

4

18. SUPPLEMENTARY NOTES
Report demonstrates usefulness of multi-disciplinary technique for addressing channel maintenance affects on cultural resources.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
Cultural Resource Management, Archaeology, Survey Methodology

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report describes a cultural resource inventory and geomorphological assessment of Navigation Pool 16, situated on the Mississippi River between Muscatine, Iowa, on the south and Rock Island, Illinois, on the north. The research was conducted under contract with the Rock Island District, United States Army Corps of Engineers, to assist in management problems related to maintenance of the nine-foot channel. Initially the survey was designed to

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Block 20 sample 20 percent of the Federal Land, but the final sample comprised 25 percent. Map evaluation and geomorphological fieldwork revealed that almost the entire land surface of the pool had been inundated repeatedly, leaving a mantle of silt that conceals virtually the entire survey area. Eleven previously unrecorded prehistoric sites were found, including one Archaic shell midden with a C-14 date of 5680 ± 75BP (ISGS-829); two sites also had historic 19th-century components. One previously reported prehistoric site was resurveyed. The floodplain is restricted in the Pool 16 area and has a lower site density than adjacent areas. Research results suggest a predictive site location model of small, short-term sites, surviving mainly in the upper one-half of the pool. The geomorphological data indicate that conditions of site preservation and floodplain modification cannot be generalized for the Mississippi River bottom, even on a regional basis. While the initial impact of impoundment was probably severe, current channel maintenance practices in the Pool 16 area do not adversely affect cultural resources.

ABSTRACT

This report describes a cultural resource inventory and geomorphological assessment of Navigation Pool 16, situated on the Mississippi River between Muscatine, Iowa, on the south and Rock Island, Illinois, on the north. The research was conducted under contract with the Rock Island District, United States Army Corps of Engineers, to assist in management problems related to maintenance of the nine-foot channel. Initially the survey was designed to sample 20 percent of the Federal Land, but the final sample comprised 25 percent. Map evaluation and geomorphological fieldwork revealed that almost the entire land surface of the pool had been inundated repeatedly, leaving a mantle of silt that conceals virtually the entire survey area. Eleven previously unrecorded prehistoric sites were found, including one Archaic shell midden with a C-14 date of 5680 ± 75BP (ISGS-829); two sites also had historic 19th-century components. One previously reported prehistoric site was resurveyed. The floodplain is restricted in the Pool 16 area and has a lower site density than adjacent areas. Research results suggest a predictive site location model of small, short-term sites, surviving mainly in the upper one-half of the pool. The geomorphological data indicate that conditions of site preservation and floodplain modification cannot be generalized for the Mississippi River bottom, even on a regional basis. While the inital impact of impoundment was probably severe, current channel maintenance practices in the Pool 16 area do not adversely affect cultural resources.

A

TABLE OF CONTENTS

Page

Appendices VIII, IX, and X are bound separately as they contain specific site locations.

LIST OF FIGURES

Figure Page

LIST OF TABLES

INTRODUCTION

This report describes and details the results of a cultural resource survey and geomorphological study of Navigation Pool 16 on the Mississippi River between Illinois and Iowa (Fig. 1), with the southern boundary of the pool at Muscatine, Iowa, and the northern boundary at Rock Island, Illinois. Navigation Pool 16 was formed in 1937 with the completion of Lock and Dam No. 16. The pool is about 33km (22mi) long, extending from approximately river mile 457 to river mile 478; the incorporated floodplain ranges in width from about 7.2km (4.5mi) near the Rock River confluence at the upper end of the pool to about 2.1km (1.3mi) through most of the middle and lower portions. Normal pool level was established at 545ft above mean sea level. This ideal level was retained only 20 percent of the time between 1940 and 1972, with levels being above normal 40 percent of the time and below normal an equal amount. The lowest level recorded was approximately 535ft, and the highest was 551ft during the April 1965 flood. Alterations in the pool level imply erosional impacts at the water/land interface, impacts that are intensified by both natural and artificial wave action.

A major geomorphic characteristic of this pool is the extremely narrow floodplain, which in many areas consists only of narrow terraces, alluvial fans, and colluvial slope deposits. The narrow floodplain is in distinct contrast to the broad floodplains of Pool 15 (above Pool 16) and Pool 17 (below Pool 16). Comparison of available locational data from these pools clearly shows that prehistoric settlement and utilization of the Pool 16 area were limited and tempered by the narrow floodplain.

The study was conducted by archeologists and geologists from Illinois State University (ISU) in the summer of 1981 and had the following research objectives: (a) to conduct a 20-percent archeological survey of the approximately 4,722 acres of Corps of Engineers land in Pool 16, (b) to clarify the erosional and depositional characteristics of the floodplain prior to and after the establishment of the nine-foot navigation channel, (c) to evaluate the effects of erosion from maintenance of the pool on the cultural resources within the pool, and (d) to integrate the geomorphological and archeological data acquired to formulate a qualitative predictive model of the cultural resources in the entire pool.

Michael L. Barnhardt, assistant professor of Geography at ISU, conducted the geomorphological fieldwork with the assistance of Paul F. Person and members of the archeological survey team. The cultural resource survey was directed jointly by Edward F. Jelks, professor of Anthropology at

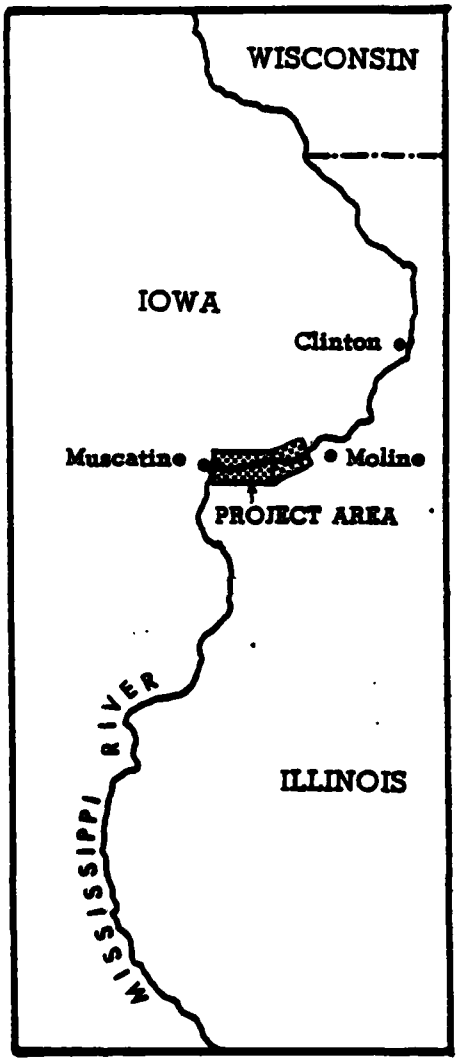


Fig. 1. Location of Navigation Pool 16

ISU, and David L. Carlson, assistant professor of Anthropology at ISU. Frederick W. Lange, associate professor of Anthropology at ISU, coordinated portions of the archeological field survey and supervised a historical assessment of the project area. Joseph S. Phillippe, ISU research archeologist, was field supervisor for the cultural resource survey; David Dycus, Floyd Mansberger, and Frederick Thomas assisted him in the field. Mark Esarey completed a ceramic analysis for Site 11-Ri-510. Stan Riggle, who at the time of this research was Chief of the State Archaeological Survey, State of Iowa, graciously prepared an analysis of mussel shells from Site 11-Ri-506.

Some geomorpholcgical research was begun in June, but collection of the bulk of the field data, both archeological and geomorphological, began 3 August and continued intermittently until the first week of September 1981; high water conditions prevented work during the summer. Eleven previously unrecorded archeological sites were found on Corps of Engineers property during the survey, and one previously recorded site was re-located and assessed. Artifacts collected at the sites were accessioned at the Midwestern Archeological Research Center (MARC) located in Edwards Hall at Illinois State University. They will be provided permanent curation, along with the field notes, maps, photographs, and other records of both the cultural resource survey and the geomorphological study.

PROJECT BACKGROUND

History

A literary, documentary, and archival search for historical resources pertinent to Navigation Pool 16 was conducted by consulting records at various municipal, county, and state agencies in Iowa and Illinois; oral history was obtained by interviewing local residents. This was done to obtain site locational data on pre-1930 historic or prehistoric sites and to provide a historical framework for known sites. No historic sites had been previously recorded.

The primary sources consulted were the U.S. Government Land Office (USGLO) plats (ca. 1837) and the late 19th-century county atlases (Harrison and Warner 1874; Huelinger Publishing Company 1894; Iowa Publishing Company 1905; Northwest Publishing Company 1894; Thompson and Everts 1868; Unigraphic, Inc. 1975); the major secondary sources used in this research were Acme Publishing Company (1889), Bateman (1914), Chapman Brothers (1885), Downer (1910), Interstate Publishing Company (1882), Kett (1877), Parker (1942), Richman (1911), and Western Historical Company (1879).

The survey team visited the municipal offices in Buffalo, Andalusia, Muscatine, Freeport, and Montpelier, Iowa; the local libraries in Davenport and Muscatine, Iowa; and in Rock Island, Illinois. We stopped at places in the project area where residents tend to congregate, such as general stores. Although this method of making initial contact with local collectors has been successful in other regions of Illinois, few informants were found with a knowledge of the prehistory or history of Pool 16. Apparently few people from this part of the Mississippi River Valley collect aboriginal material from nearby fields. The Muscatine County Historical Society (Muscatine, Iowa) and the Rock Island County Historical Society (Moline, Illinois) were also visited.

In Illinois and Iowa, as well as in other Midwestern states, a wealth of data exists about late 19th- and 20th-century settlement; however, little documentary information pertaining to pre-Civil War settlement of the Mississippi River bottom in Muscatine, Scott, and Rock Island counties was found. The analysis of the USGLO plats is a valuable source of information relevant to the early Euro-American settlement of the project area. The Illinois Department of Conservation Landmarks Survey and Structures Survey also were consulted. No sites were recorded within Pool 16.

We also examined the plane table surveys that were conducted for the land purchases necessary for construction of Pool 16. A related resource, also available in the archives of the Rock Island District of the Corps of Engineers, was photographs of standing structures taken at the time land was acquired in the late 1930s. Structures included in these photographs were largely farm or fishing cabins. No 19th-century structures were observed. Both USGLO plats and the land acquisition photographs confirm a lack of either dense or permanent 19th-century settlements in the river bottom proper.

Prehistory

The previous prehistoric archeological research in and around Pool 16 had been limited, by and large, to the bluff tops and high terraces. No previous systematic survey of the shoreline or islands had been conducted on either the Illinois or the Iowa side of the river.

The earliest scientific investigations in the area of Mississippi River Navigation Pool 16 were conducted by members of the Davenport Academy of Science, who excavated a number of mounds on the bluffs between Davenport and Muscatine during the 1870s and the 1880s. Starr (1895:103-104) described a group of six mounds located near Pine Creek that were dug by Lindley of the Davenport Academy. Another mound group containing 15 mounds, including one nearly 20 feet high, and located a half mile south of Pine Creek on a high ridge also was excavated by Academy members (Starr 1895:105). A mound group that formerly stood in Section 22 of Montpelier Township also was opened by members of the Academy. One of the nine mounds in this group contained an eight-foot circle of limestone blocks at its center (Starr 1895:104).

In a majority of these mounds the excavators recovered only a few skeletons and artifacts (Starr 1895:103-108). The artifacts were usually poorly described and not illustrated in reports of the work. The members of the Davenport Academy were more interested in the origin and nature of the "Mound Builders" than in the subsistence and settlement questions that interest today's archeologists (Van Dyke 1981:13). The techniques and interpretations of these early practitioners were far less exacting and less directed than those of more recent researchers. However, they have conducted the only excavations in the area between Davenport and Muscatine, and much of what we know of the prehistory of the area comes from their efforts.

During 1932 and 1933, archeologists from the University of Chicago conducted an archeological survey of Rock Island County. Survey techniques included informant contact and pedestrian survey. The surveyors recorded a number of sites along the bluff tops and on terraces near the bluff base just outside the Pool 16 survey area (Harrington 1933). In 1974 the Pool 16 area was visited by a survey crew from the University of Wisconsin-Milwaukee in conjunction with the Illinois Historic Sites Survey. They recorded several sites in the Mississippi River floodplain just outside the project area (Birmingham 1974:79-85). While technically outside the survey area, these sites represent a more complete projection of regional settlement patterns and site densities.

In 1977, the office of the Iowa State Archaeologist conducted an Environmental Impact Survey for a bridge replacement near Muscatine, Iowa. They recorded two sites, one of which (13-Mc-75) is located in the project area (Hotopp and Fokken 1977:3-4). Finally, Impact Services Incorporated conducted an archeological survey of Kilpeck Island, Louis County, Iowa, in 1980 (Roetzel 1980:1-11). No sites were located.

On 22 and 23 June 1981, Phillippe and Thomas visited the office of the State Archaeologist, the office of the State Historic Preservation Officer, and the State Historical Library in Iowa City, Iowa. The intent of the visit was to obtain site information and previous reports pertinent to the project area. The State Archaeologist's office supplied us with site-specific information via a computer search, as well as xerox copies of site forms and reports on sites. This information was checked against information at the State Historic Preservation Officer's office. Available site and survey reports at the office, as well as National Register applications and nominated site files, were all checked at that time.

Documentary research was also conducted during our visit at the State Historical Library. This work included the checking of plat books, county histories, and other pertinent sources.

Rock River Surveys

Although there had been little archeological work along this stretch of the Mississippi shore until the Pool 16 survey, the adjacent Rock River has been the focal point of research by a number of different institutions. An excellent synthesis of this work is found in reports prepared by the Great Lakes Archaeological Research Center (Van Dyke and Overstreet 1979; Van Dyke, Overstreet, and Theler 1980:13-21). We suspect that the positive locational advan-

tages--for both transportation and floodplain agriculture-of the Rock River had a significant negative influence on permanent or dense prehistoric habitation in the Pool 16 area.

Geomorphic History of the Pool 16 Valley

The drainage evolution of this pool is detailed by Anderson (1968) who stated that some doubt still exists regarding the establishment of the pre-glacial landscape. The ancient Mississippi River drained southeast through the Meredosia Channel and Princeton Bedrock Valley and joined the Illinois River near Hennepin, Illinois. This channel, blocked by glacial ice during the Illinoian Glaciation, was displaced westward, and most of the bedrock erosion in the pool occurred during this time. Anderson (1968) stated that a large ice-dammed lake, Lake Moline, was impounded in the Green River lowland area and eventually drained down the Rock Island channel. During one phase, the drainage cut the Andalusia Gorge, a narrow point in the present channel south of Andalusia (Horberg 1950). The outlet for the drainage was at 700 feet with the contemporary river level being 550. Some valley filling occurred, but as the Illinoian glacier retreated, these valleys were reexcavated by the meltwater.

During Wisconsinan glacial advances, the Andalusia Gorge was once again used as an outlet for glacial Lake Milan. Glacial deposition in the form of moraines and outwash from these glaciers was sufficient to dam the Ancient Mississippi channel to the Illinois River and, therefore, help maintain the present channel configuration. The Bloomington moraine acts as a barrier to the southeast that is too high to be breached by the present river system. Terraces along the river are remnants of the once extensive valley train associated with the Bloomington moraine. Extensive deposition occurred in the Rock River valley at this time and Anderson (1968) interpreted this as a result of an overloaded Mississippi River backing up water into the Rock River Valley. The lowest recognizable terrace along the river is correlated with the old Mankato Terrace, now part of the Valders glacial advance, about 10,000 years BP (Anderson 1968; Willman 1956; Willman and Anderson 1956; Willman et al. 1968; Willman and Frye 1970).

Types of Geomorphic Features

The narrowness of the floodplain through much of the pool affects the local geomorphology significantly. High flow periods are generally confined to major channels and not dispersed laterally over large areas. This may account

for the general lack of terrace development below Anderson's (1968) Mankato Terrace. River bluffs along this stretch of the Mississippi are generally 77-92m (250-300ft) high and, while not within the study area, play an important role in the Pool 16 sediment input. Easily eroded silts (loess) dominate the bluff sediments; through natural processes, now accelerated by urban expansion and agricultural practices, these have contributed massive quantities of material to the river and its tributaries (Piskin and Bergstrom 1975; Smith 1942).

River terraces in this area have been classified as low, middle, and high, but most terrace surfaces are outside the study area. The terraces, all of Late Pleistocene-Holocene age, provide excellent surfaces for human occupation (Bi-State Metropolitan Planning Commission 1980, 1981). The Late Pleistocene-Holocene placement of these terraces is also supported by Anderson (1980:Pl. 1).

The Mississippi floodplain just below the confluence of the Rock River constitutes the major floodplain segment in the pool. The other areas inundated during high flows are the numerous islands that roughly bisect the river. These islands are heavily vegetated, but their geomorphic surfaces are considerably younger than those of the neighboring terraces or bluffs. Consequently, while available for human occupation, frequent inundation--together with accompanying erosion and sedimentation--lowers the probability of finding surface artifacts of prehistoric age. Bank exposures and river cutoffs appear to offer the best opportunities for geomorphic and archeological investigations.

The generally low-lying topography of the present islands and riverbank, and the related opportunity for frequent inundation also meant that stable plant and animal communities that could have been attractive to prehistoric peoples and early European settlers for resource exploitation were not fully established. A clue to this condition is the almost complete absence of oak-hickory clusters (indicating generally dry conditions) in the Pool 16 area (and their probable absence in pre-lock and dam times as well) compared to their frequent occurrence on islands (and apparent correlation with archeological evidence) in the Pool 12 area.

Remembering that low water is experienced with equal frequency as high water on the river, many of the "islands" have been, from time to time, extensions of the mainland rather than isolated surfaces. As water-edge mainland extensions, they would have been inviting locations for short-term, seasonal exploitation.

Multidisciplinary Approach

The objective of the research requested by the Rock Island District of the Corps of Engineers was to develop an interplay between geomorphic and cultural data that would both measure past changes in landform and aid in development of a predictive model to assist management requirements. The intent was to conduct a multidisciplinary research effort against the historic, prehistoric, and geomorphic background of the general segment of the Mississippi Valley which includes Navigation Pool 16.

In the coordination of the natural and cultural data, the former would indicate areas that were potentially least disturbed and therefore best for survey. The cultural data would, by inclusion in soil profiles, superposition above flood lines, or burial beneath natural geomorphic markers, help to provide a chronological framework for interpreting the evolution of the natural landscape. They would also clearly reflect the ebb-and-flow between natural and cultural events. A special case is the past two hundred years of the historic era, which presents the opportunity to evaluate the impact of European settlement on the Midwestern landscape. The effects of deforestation, farming (especially plow agriculture), and subsequent increases in erosion, runoff, and silting are all reflected in the geomorphological record. We particularly felt that we could successfully utilize known historic locations as benchmarks for dating geomorphological development and alteration of the Pool 16 landscape.

Out of this coordinated effort would emerge a general picture of where sites were most likely to occur, either on or beneath the surface, which would contribute to desired management objectives. The impact of lock and dam construction and subsequent channel maintenance on the landscape and on cultural resources could also be measured.

Since only a 20-percent sample of the pool area was to be surveyed, some preliminary detailed research on the geomorphology of the ever-shifting bottomland of the Mississippi River would have been very helpful. Since it was not available, and in view of the coordinated effort that was desired, initial attention was placed on developing a geomorphological background and on conducting literary research on the historic and prehistoric resources.

Original Research Design

In response to the Scope-of-Work, a sampling design was initially developed which would produce a scientifically

valid 20-percent sample of the topographic units in the pool. This stratified sampling design was based on three broad sampling strata. The first two related to major topographical units: the intersection of a tributary with the Mississippi River, and the islands present in the river prior to the construction of the nine-foot channel. All of the remaining lands fell in stratum 3. Within this stratum two further subdivisions were made: (1) a systematic division of the pool into five-mile sections to guarantee that tracts along the entire length of the pool would be examined, and (2) a subdivision by elevation within these five-mile sections. Sampling tracts within these strata were to be identified and numbered. The actual shape of the tracts would have been irregular since each would have represented a contiguous section of land. Areas of the tracts were to be held roughly equal, and the sampling fraction to have been used would have been adjusted so that a total of 20 percent of the federal lands would be surveyed. The selection of the tracts was to be random, although tracts with known or reported sites would also have been surveyed.

As the initial geomorphological study proceeded, however, it became evident that virtually all prehistoric and early historic land surfaces in the pool were completely covered by sediments from recent floods. Thus, cultural remains on or below those buried surfaces could not be detected by surface inspection, except at places where there had been displacement of the surficial sediments by erosion or excavation. Some revision of the initial research design became necessary.

Revised Research Design

After consultations with the Contractor's Authorized Representative, we abandoned the randomized, surface-survey component of the original sampling plan and concentrated on (a) locating and inspecting as many places as possible where subsurface deposits were exposed, (b) digging shovel tests at highly elevated spots where the sediments should be relatively thin, and (c) visiting and shovel-probing places where 19th-century or early 20th-century structures were known, from the documentary search, to have once stood. Special care was given to ensure that intensive survey was carried out in the three sampling strata identified in the original research proposal. In addition, Pool 16 was divided into three survey areas roughly conforming to the upper quarter (Area 1), middle half (Area 2), and lower quarter (Area 3) configuration of the pool (Fig. 2). A total of 25% of the property of the United States Army Corps of Engineers in the pool 16 area was surveyed. Although the division of the survey area into three units was based on

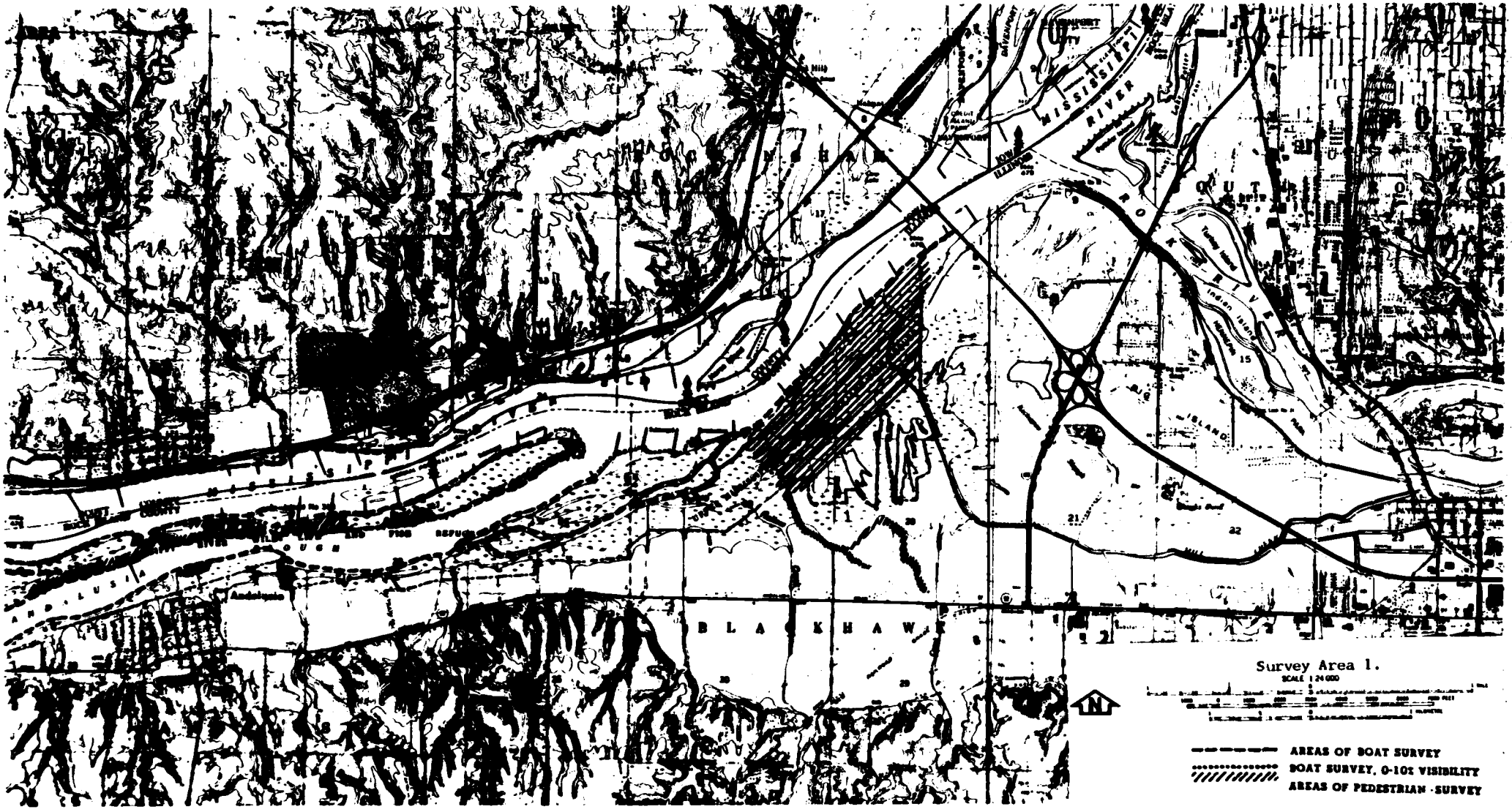

MISSISSIPPI
RIVER
BLACKHAWK
Survey Area 1.
SCALE 1:24 000
N
AREAS OF BOAT SURVEY
BOAT SURVEY, 0-10% VISIBILITY
AREAS OF PEDESTRIAN SURVEY

Fig. 2.

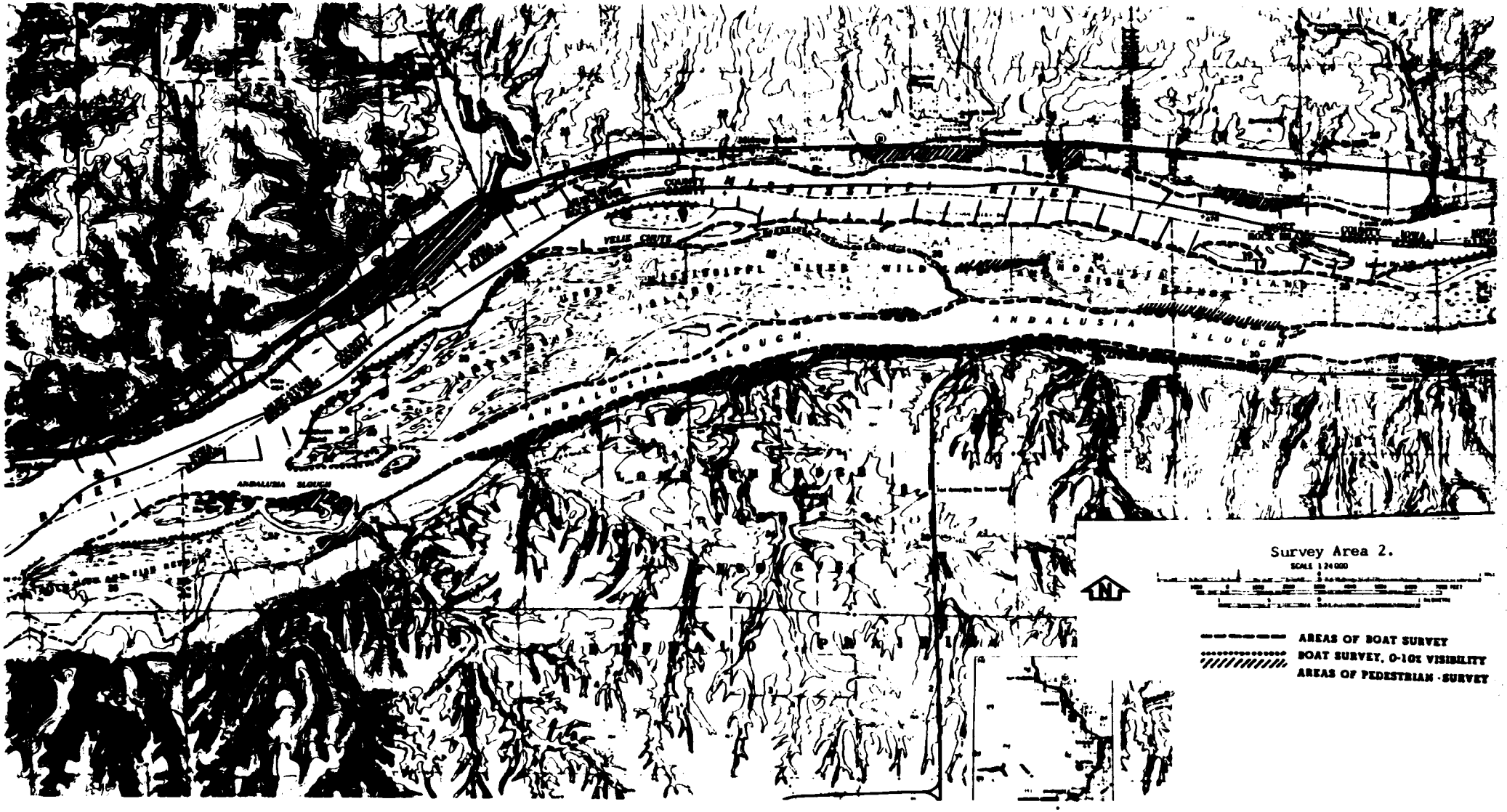

Survey Area 2.
SCALE 1:24 000
AREAS OF BOAT SURVEY
BOAT SURVEY, 0-10% VISIBILITY
AREAS OF PEDESTRIAN SURVEY
ANDALUSIA SLOUGH
MISSISSIPPI RIVER

Fig. 2.

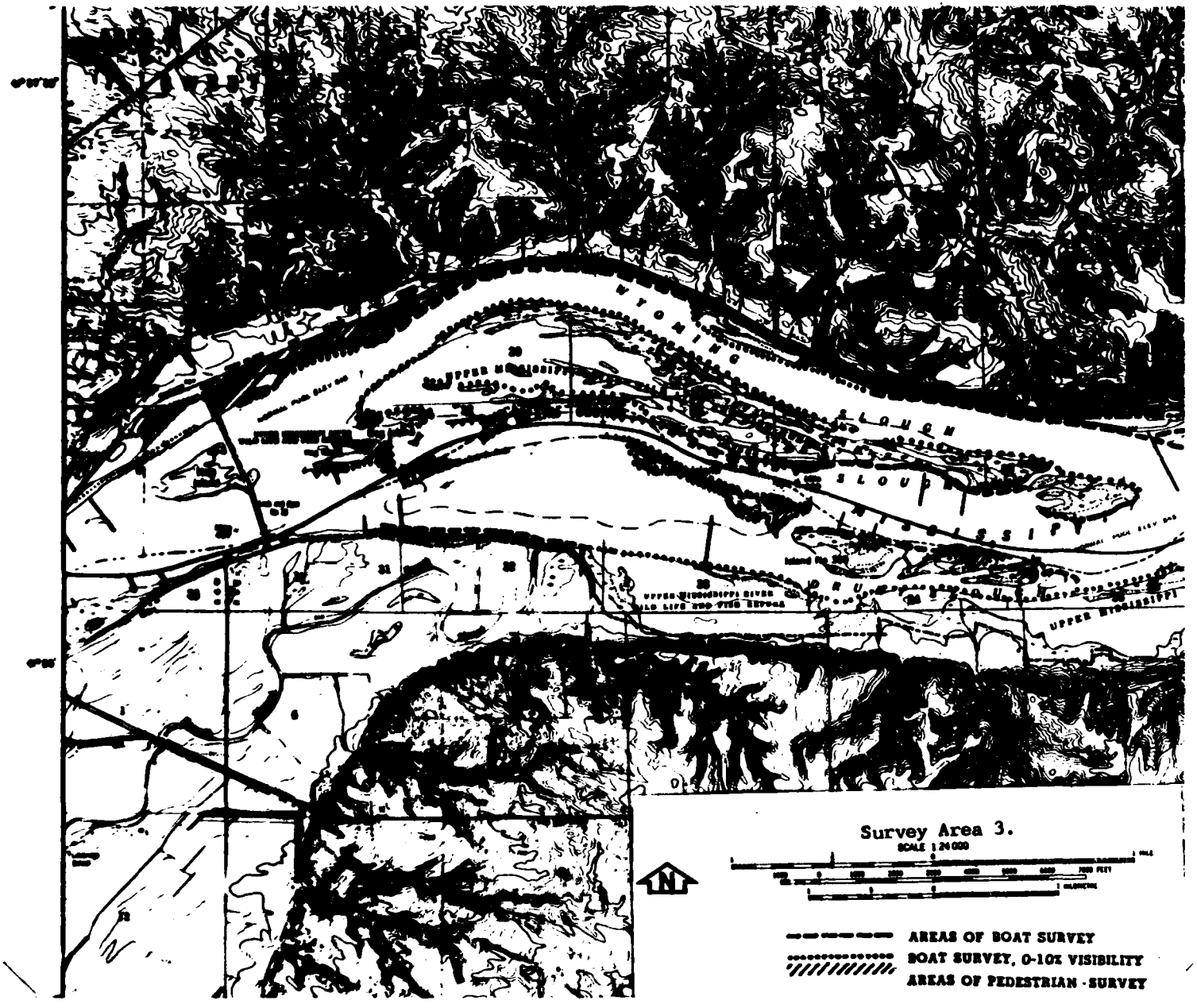

Survey Area 3.
SCALE 1:24 000
N
AREAS OF BOAT SURVEY
BOAT SURVEY, 0-10% VISIBILITY
AREAS OF PEDESTRIAN - SURVEY

Fig. 2.

the current environmental setting, special consideration was given to what the prehistoric landscape would have been like and what areas would have been good for prehistoric habitations. These areas then were considered high priority areas for survey.

SURVEY PROCEDURES AND RESULTS

Geomorphic Subdivisions of Navigation Pool 16

As noted previously, the pool and its islands were subdivided into upper, middle, and lower units to better organize and discuss their geomorphic characteristics and depositional patterns. This division reflects typical pool formation on the Mississippi's "Stairway of Water." The upper quarter of the pool is most affected by the tailwater conditions of the upstream lock-dam and pool; the middle half of the pool is relatively unaffected by either the upstream or downstream lock and dam; and the lower quarter of the pool is heavily affected by the downstream lock and dam. The upper islands have experienced relatively less inundation, while the middle islands have lost significant areas. Inundation of the lower islands by Pool 16 has been nearly total, with only a few ridges barely remaining above normal pool (Fig. 3). Reflecting both geomorphological considerations and Corps of Engineers landownership patterns, the largest percentage of survey was conducted in the upper one-half of Pool 16.

Methodological Techniques Applied to Study

PHOTOGEOMORPHOLOGY

In the initial stages of any geomorphic study, it is important to examine aerial photographs to obtain an overview not available from maps. The vertical perspective aids in the identification of features, especially the ridges which are most often heavily vegetated. Since this study is concerned with the pool changes related to lock and dam construction and maintenance, photos from 1937, 1951, 1956, 1970, and 1975 were examined. By adjusting for different pool heights at the time the photos were taken, areas of major and minor change were noted. Zones of major change provide data on erosion and/or sedimentation patterns, while areas of minor change provide data relevant to the pre-dam period and, thus, give baseline data needed to assess post-dam changes (Leopold, Wolman, and Miller 1964; Reineck and Singh 1980). These minimally affected sites also provide the greatest opportunity for finding surface artifacts and old geomorphic surfaces. We also noted that during highest water in the flood of 1965, only a very small patch of land in the upper quarter of Pool 16 remained above water. By contrast, it appears that many land surfaces in Pool 12 had only infrequently, or perhaps never, been inundated.

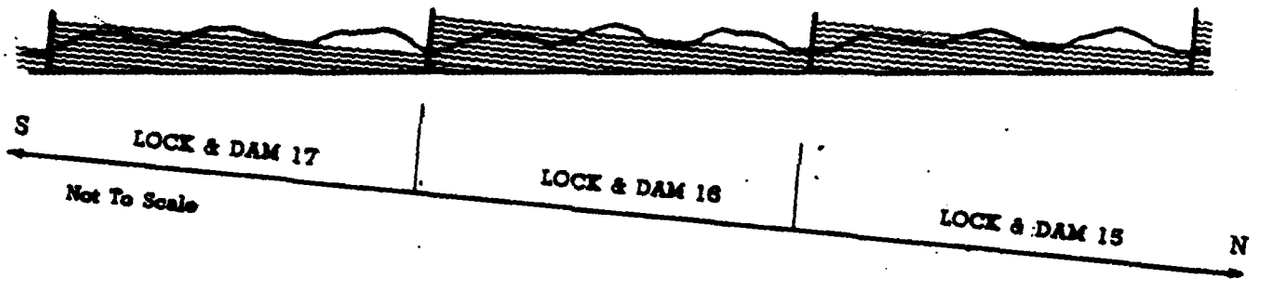


Fig. 3. Pool Profile.

GEOMORPHIC MAPPING

Differences in island morphology were studied by comparing the 1892 map prepared for the Mississippi River Commission with the GREAT II (prepared by Environmental Systems Research Institute; Aerial Information Systems for the Great River Environmental Action Team 1978), and Resource Management maps. The two-foot contour pre- and post-dam maps provided valuable information regarding the optimum localities for field examination. The two-foot maps were color-coded to discriminate between ridges in excess of 556ft, ridges from 554 to 556ft, and ridges lower than 554ft (Fig. 4). The basic assumption was that the higher ridges would not be subject to inundation as frequently as lower features and would, therefore, tend to be favorable sites for the preservation of old geomorphic surfaces. Sites with radiocarbon-dated shell and organic material were found in this manner. In addition, a recent slough cutoff was trenched to examine the depositional patterns in backwater and side channels.

DENDROGEOMORPHOLOGY

This technique involves counting the tree rings of trees found on geomorphically significant sites. Such a site presented itself on Island 317, where severe bank erosion had undercut a live maple and the resulting instability triggered the tree into producing buttress roots for support. Several sequences were noted and cross sections were taken for subsequent laboratory analysis. The maple trees sampled for ring counting of the buttress roots were growing on longitudinal sand ridges about 1 to 1.5m above normal pool level. The ridges are south-facing and provide full sunlight during most of the day. The water table is generally within the major rooting zone of these trees. Undercutting of the bank resulting in surface instability seems to be the most serious environmental growth limiter for these trees.

Ring growth in the cross sections examined is asymmetrical in the direction expected in buttress root growth. All rings were complete, although some could be missing. Since all rings were well-formed (none was exceptionally narrow or irregularly shaped), it appears unlikely that any are missing. Also, the short length of record and the growth habits of maples tend to support the complete record assumption. Multiple rings are a possibility, but the symmetry of the ring widths (aside from the asymmetry induced by instability) suggests that multiple growth peri-

Fig. 4. Changes in shoreline and land formation in the Pool 16 area.

Pre-lock-and-dam data were obtained from the 1875 base data (published in 1892) and from the 1922 "Brown's survey" map. The former is shown in yellow, and the latter in red; both are keyed to the 545ft-contour level. Postlockand-dam data were derived from an aerial photograph taken on 19 April 1965 (shown in blue) to record which land surfaces would have been above water at the highest historically recorded flood stage, and from a 1979 aerial photograph (shown in green). The water level in 1965 was 551.2ft, and 544.38ft in 1979.

Note: The Figure 4 maps are too large to bind in the report and are in a pocket on the inside back cover.

ods did not occur. However, if multiple rings were put down making the record shorter than previously thought, the result would be to reevaluate the estimated rate of sedimentation and erosion at these sites in an upward direction.

Immediately downstream of this site (within 3mi) the trunk of a dead American elm (Ulmus americana) was buried in recent sediment to a depth of almost one meter. On the same island about 0.5km (0.3km) upstream, another highly decomposed American elm was buried to a similar depth. No attempt was made to produce a tree-ring chronology using the elm trees, in order to derive a more accurate date for the death of the trees, because the preconditions necessary for a chronology could not be met. First, the highly decomposed state of the wood prohibited the taking of cores. Second, an inadequate sample of elms was available for statistically reliable correlations. Third, no master chronology has been developed in the area for this species. Fourth, the raised water level and subsequent decrease in drought-related stress and increase in potential inundation most likely altered the sensitivity of any previously viable specimen and, therefore, changed the cross-dating capability of that sample. Fifth, since these trees have died within the last thirty years (probably less), the sediment accumulated about their bases is historical, a fact corroborated by the excavation of a piece of aluminum foil at a depth of 35cm immediately adjacent to the elm at Site H. The rapid sedimentation at this site, in at least two distinct phases, is supported by geomorphic and stratigraphic evidence found at other sites.

SOIL GEOMORPHOLOGY

Soil geomorphology is the merging of geomorphic and pedologic principles such that former landscapes can be interpreted and reconstructed using soil morphology and chemical, physical, and mineralogical data. Several buried soils were located within the study area. Their characteristics and relationships to each other, and to the underlying and overlying sediments, formed the basis for much of the geomorphic interpretation presented in this report. Thompson and Bettis (1980) stressed the importance of using buried soils (paleosols) to interpret landscape changes in their western Iowa study. Soil organic matter from the base of one buried soil was radiocarbon dated, as was buried organic matter that had accumulated in a slough. Both dates provided useful time frames for interpreting sedimentation patterns in the pool (U. S. Department of Agriculture 1977; Willman, Glass, and Frye 1963).

RADIOMETRIC DATING

The successful completion of most geomorphic studies often lies in the acquisition and dating by radiocarbon analysis of buried organic matter found in geomorphically significant positions. At Pool 16, buried soil humus, former slough accumulations, and buried shells from a midden were dated; these provide the foundation upon which the paleoenvironmental reconstruction is based. Without absolute (radiometric) dates, the highly variable rates of erosion and sedimentation within the pool can be very deceptive and misleading. Still, the small number of dates used herein require careful interpretation.

Because of the combined geomorphological/archeological emphases of the project, survey efforts ideally served both purposes. Geomorphological survey often identified potential areas of archeological interest, and the archeological survey efforts sought to identify features of a geomorphological significance.

ARCHEOLOGICAL METHODS

Because topography and vegetation vary greatly, a number of different survey methods were employed to locate sites: pedestrian survey, where feasible; shoreline survey by boat; excavation of test pits; and cutting soil profiles along the shoreline of islands. A shoreline survey by boat had been quite useful at Lake Shelbyville (Phillippe and Hodges 1981) but proved less successful in Pool 16. No archeological sites were located during the boat survey, but access was gained by boat to many areas where other survey methods could be and were employed. The archeological survey also included the testing of areas where it was thought that information could be obtained to supplement the geomorphological study.

These operations, which sought both to identify buried cultural horizons and to obtain geomorphological data, are noted as part of the archeological survey. The most frequent technique was to quickly excavate a 1 by 1 meter test pit (herein referred to as "soil pits" since it was assumed more geomorphological data than cultural data would be recovered from them) to a depth of as much as one meter or until water levels were intersected. In some cases, the bottom of these pits was cored an additional one to two meters. This revised approach was productive, resulting in a sample of geomorphic settings and archeological sites which we believe to be representative of the pool as a whole, even though there was no statistical randomization.

SURVEY COVERAGE

The survey covered 25 percent (5% above the targeted requirement) of the property owned by the United States Army Corps of Engineers in Pool 16. The Corps of Engineers owns approximately 4,722 acres of land above the minimum pool level. Much of this land is at the upper end of the pool in the Upper Mississippi River Wild Life and Fish Refuge. The United States Fish and Wildlife Services manages the refuge and about 2,700 acres of U.S. Army Corps of Engineers property. The pool contains approximately 231 miles of shoreline including islands and riverbanks, and the Corps owns 200 miles of the total shoreline. Test excavations or profiles designed to detect cultural and geomorphological features were placed at 24 locations in the project area. Twenty-one of these tests were on islands, none was on the Iowa shore, and three were on the Illinois shore. On both shores, stable profiles were available, and there was much less need for testing.

RESULTS OF THE SURVEY

Representative geomorphological data, which are described in detail below, were obtained from each survey unit, and eleven previously unrecorded prehistoric sites were found and recorded. Two of the eleven also had historic 19th-century components. They were assigned temporary site numbers (ISU-1 through ISU-11); Iowa and Illinois survey numbers were assigned subsequently. A twelfth site in the survey area had previously been assigned a site number (13-Mc-75) by the office of the State Archaeologist of Iowa, and this site was resurveyed. Site locations are provided in Appendices I and II, and detailed site data are in Appendix IV.

Survey Area 1
(Upper Quarter; river mile 472 to 478)

Area 1 is located at the northeastern end of Pool 16 and contains approximately 30.5 miles of shoreline. Twenty-one miles of shoreline were surveyed by boat and 0.7 square miles were surveyed on foot (Fig. 5).

IOWA SHORE

The Iowa shore in this area is highly developed with both industrial complexes and private residences. Because this is the highest natural elevation of shoreline in Pool 16, the Corps of Engineers owns little property here; only the southern end of this area was surveyed. The shoreline ranges from short, steeply eroded slopes to sandy beaches, and the amount of exposed shoreline varies greatly with fluctuating water levels. The shoreline was relatively devoid of vegetation, and surface visibility was approximately 60 to 80 percent.

The shoreline was inspected from a boat passing approximately 2m from shore. No archeological sites were identified, and the only artifacts collected were some cut mussel shells--blanks for button manufacture--found near the boat-access area at Buffalo. Both Buffalo and Andalusia were centers where shell was brought to be processed prior to being shipped downstream to button factories at Muscatine (Kenneth Finley, personal communication).

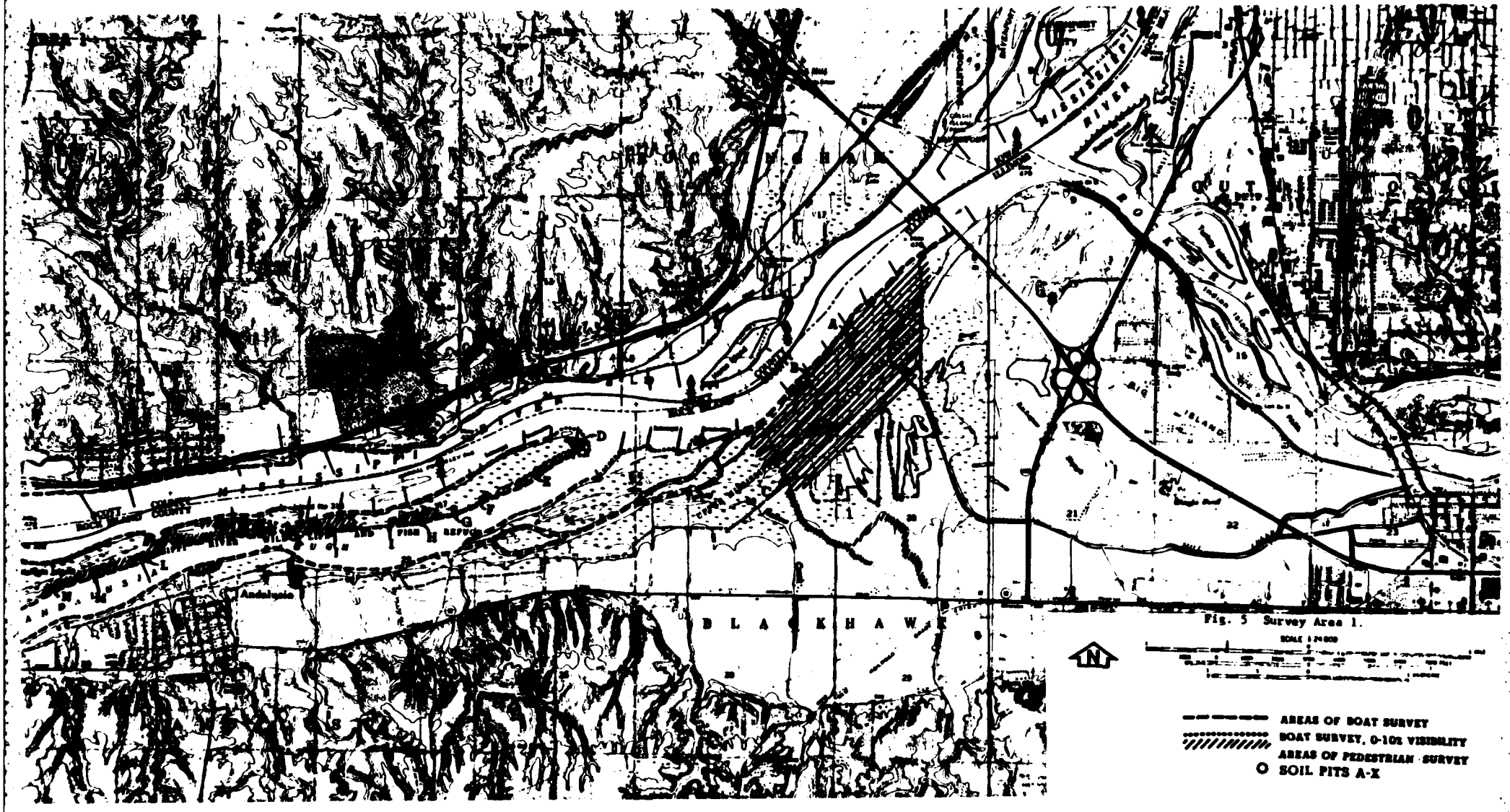


Fig. 5 Survey Area 1.

ISLANDS

The islands surveyed in Area 1 were Nos. 317, 318, 319, and the northern tip of Andalusia Island. These islands are covered with dense vegetation, featuring nettle thickets, heavy stands of poison ivy, and forests, and there was almost no ground visibility. The shoreline varies from relatively steep slopes on the Illinois side to gentle slopes on the Iowa side. The gentle slopes often are covered with mats of eroded roots from trees that have been undercut by wave erosion. The amount of exposed shore varies greatly as water levels fluctuate. Islands 317 and 319 were chosen as representative of this group and were studied in detail.

Island 317 was first surveyed by boat. The north end of the island had been riprapped with rock and a wing-dam breakwater projecting into Andalusia Slough. A small cabin on stilts was located at the north end of the island on a sandy ridge, apparently the highest local point. This ridge runs along the north and northeastern side of the island; the ridge and northern tip of the island were surveyed, and a soil pit was excavated on the ridge (Fig. 5, Location D). A small area of burned soil observed just below the surface in the pit appeared to represent trash burning by the present tenants of the cabin.

Island 317 is the first channel island downstream of the Rock River confluence and appears to be representative of the upper pool islands. The Illinois side of the island exhibits a 1.0 to 1.5m shore embankment where a sand ridge runs parallel to the river. Along this shore, dozens of large trees have been undercut by wave action and have fallen into the river. Virtually every part of the bank exhibits extensive tree root exposure owing to the removal of at least 0.6 to 1.0m of overlying material. Selected sections were walked along the island's edge and a transect was followed across the center of the island (Fig. 5).

Locations D through K (Fig. 5) represent testing by soil pits, bank profiles, or coring. Location E was an eroded bank where a profile was cut but no cultural material was found. Location F was the old gas pipeline facility (Natural Gas Pipeline Company of America). In an effort to gather geomorphological data, two soil pits--one at the base of the structure and one about 20m away--were excavated. A series of cores were also taken using a soil probe.

Points G, H, I, J, and K were all cut-bank exposures profiled for geomorphological purposes. At Point I a transect was made across the island; corings were taken and several small soil pits were excavated. No cultural material was located.

DETAILED SITE STUDIES

Site H

Site H is a bank exposure, at approximately river mile 474.5, about 3m wide and 2m high consisting of an 80cm-thick unit of clear, medium sand strongly laminated with organic lenses that contain shell fragments. Figure 6 presents profile and texture data for the site and Figure 7 shows the relationships of the units. The middle unit is believed to be a buried soil of modern age. A sample of organic-rich loam/silt loam, radiocarbon dated at 1490 ± 80 years BP (Beta-3229), was from the bottom of the buried soil. It represents the minimum age for emplacement of the underlying basal unit, considered here to represent a core sand unit which underlies most of the surface sediments on the islands.

Other evidence supporting the buried soil is the major root distribution in the exposure. The major tree roots in Figure 8 are currently being exposed by bank erosion but, where still buried, are located <u>within</u> the buried soil unit and <u>not</u> above, suggesting that the upper sand unit has been emplaced only recently. Additional evidence comes from the location of a dead tree trunk (probably American elm) that is now buried 80cm by the topmost unit of sand (Fig. 9). The root structure begins <u>within</u> the soil unit and <u>not</u> in the overlying sand. In fact, no buttress or other root structures were produced by this tree, suggesting that it was either dead prior to burial or died as a result of the burial if it was not tolerant to sedimentation. Another possibility is that the tree was killed by elevated water tables created by the pool development and that the sedimentation and death were contemporaneous. The latter scenario suggests that the buried soil is modern, that is, pre-dam, and that the 80cm of sand represents sedimentation during post-dam time at a rate of about 190cm per 100 yrs.

Sedimentation rates based upon the radiocarbon date of 1490 ± 80 years from a depth of 160cm yield rates ranging from 8.8 to 9.8cm per 100 yrs, roughly five percent of the rate projected using the buried tree (Table 1). Even if only the buried soil thickness of 80cm is used, the rate of accumulation is only 16 to 18cm per 100 yrs. Therefore, if the top of the buried soil represents the historic soil surface, the rate of sedimentation has increased drastically, over 20 times the previous rate based on sedimentation patterns. Table 1 presents the projected average sedimentation rate at each site from which a radiocarbon date was obtained. The projected rates are based upon a

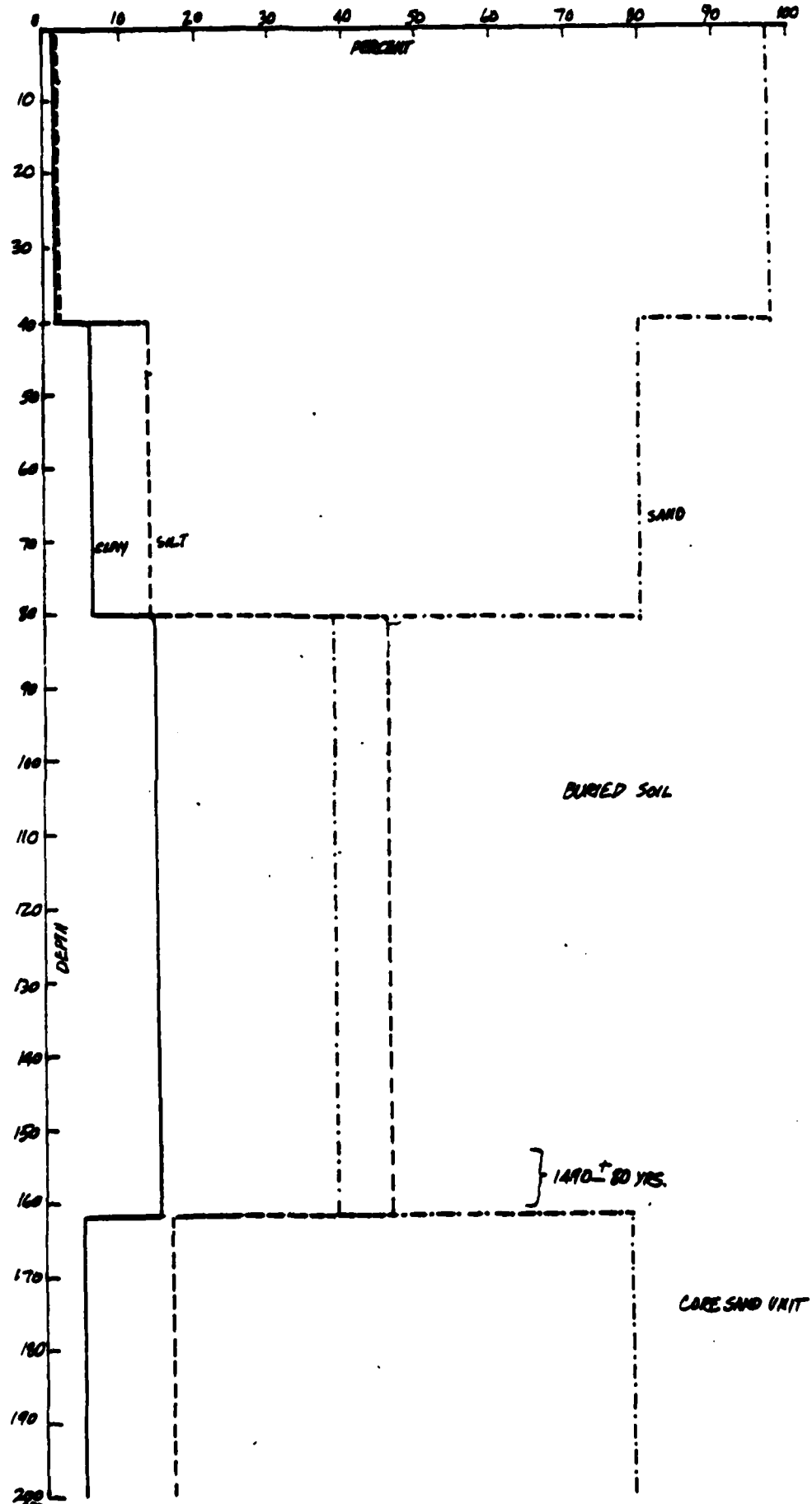


Fig. 6. Texture and horizon data for bank exposure Site H.

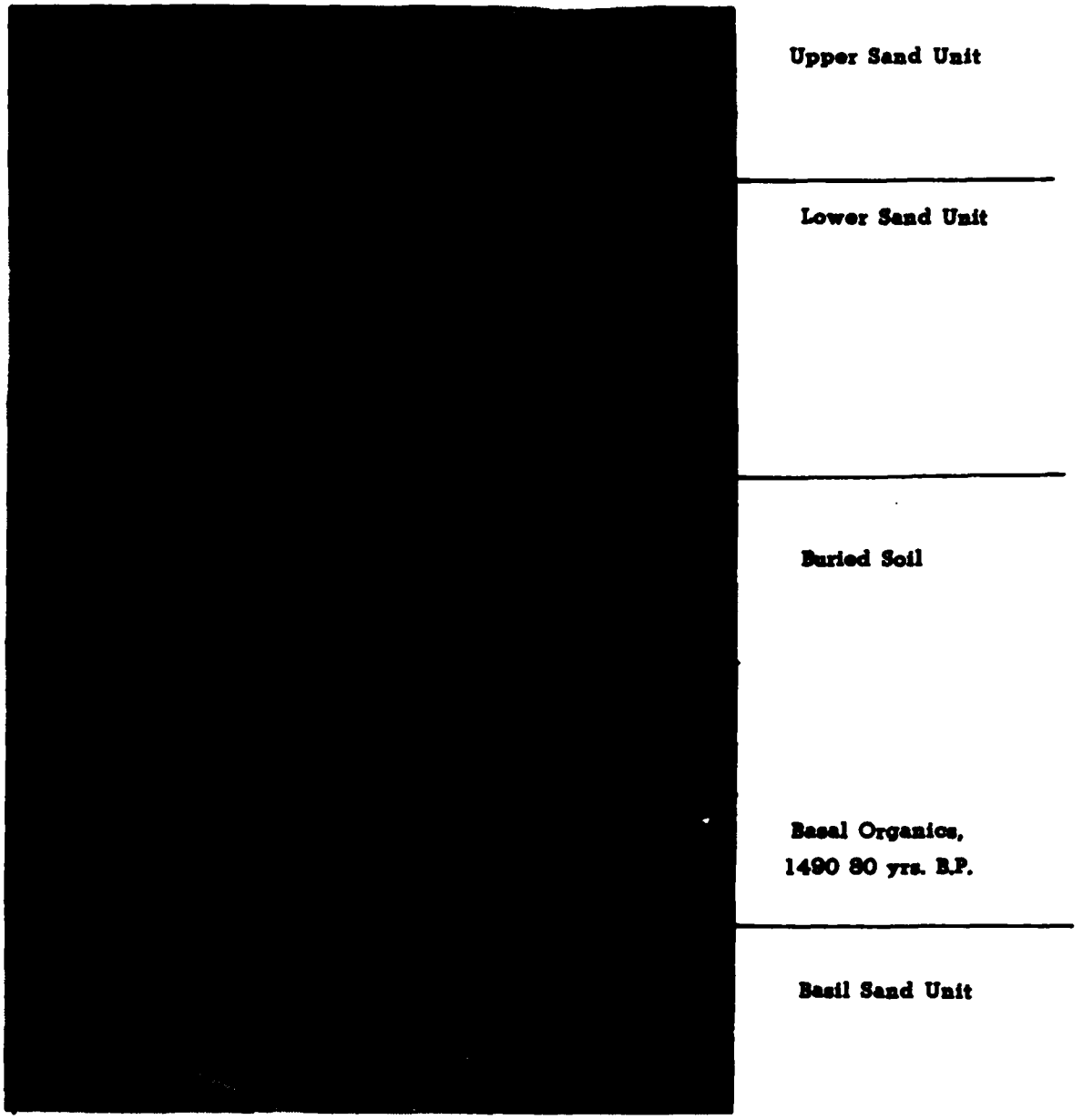


Fig. 7. Site H bank exposure. Upper laminated sand overlies buried soil dated at 1490± 80 yrs. B.P. Basal sand unit begins at top of shovel head. Upper sand unit is most likely post-dam in age.

Fig. 8. Exposed roots at Site H. About one meter of undercutting has occurred.

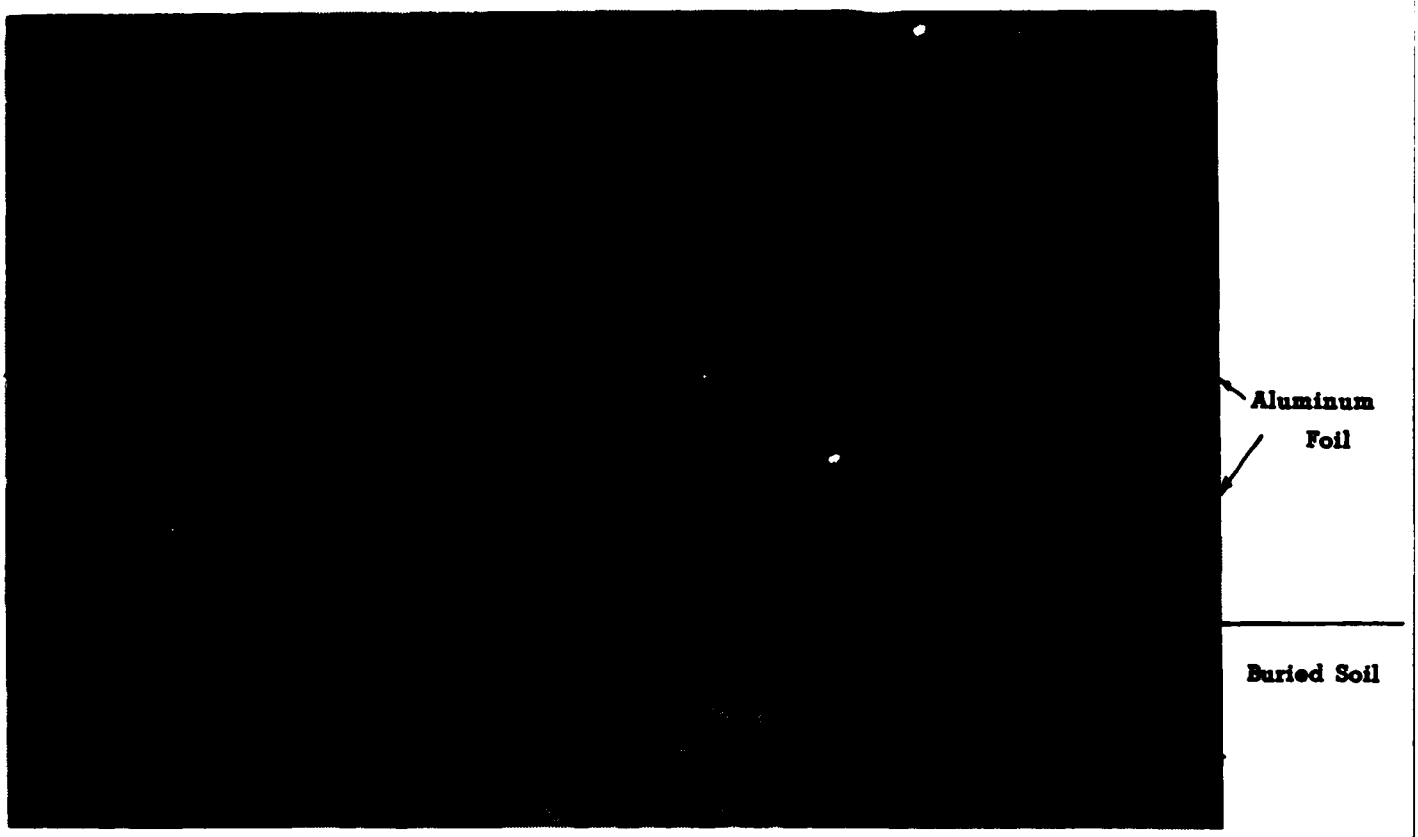


Fig. 9. Dead American elm trunk at Site H buried by 80cm of recent alluvium. Dark layer at base of trunk is buried soil of Fig. 7. At extreme right center is location of buried aluminum foil shown also in Fig. 10.

TABLE 1 AVERAGE SEDIMENTATION RATES FOR RADIOCARBON DATED SITES IN POOL 16

Age of Sample ^{14}C Years Before Present (B.P.)	Depth of Sample (cm)	Average Sedimentation Rate (cm 100YRS) (one standard deviation range)	Location of Site Material Dated	Laboratory Number
5680±75	80	71.0 (70.1-71.9)	Crest of beach ridge about 20Cm from Mississippi River. Highest Point on active floodplain. Mussel shells from midden associated with some artifacts. (11-Ri-506)	*(ISGS-829)
3760±75	150	25.0 (24.6-25.6)	Basal organic-rich sediment from beach ridge about 40m from Mississippi River. Near active slough.	*(ISGS-842)
1490±80	160	9.3 (8.8-9.8)	Buried soil on active beach ridge. Taken from base of soil which is overlain by recent sand unit.	**(Beta-3229)

*Illinois State Geological Survey
**Beta Analytic Inc.

uniform accumulation rate rather than the episodic sedimentation which most likely occurred in this area.

Even though episodic accumulation is most likely to have occurred at all sites throughout the history of this area, calculating uniform accumulation rates for these areas is still valid. Péwé (1944), working in Pool 15, and Lubinski and Seagle (1981), working in the Alton Pool, conclude that rapid initial adjustments are to be expected immediately following dam closure. Péwé (1944) noted that after the main channel had readjusted itself, little additional sedimentation occurred because of scouring effects during flood episodes when the dam gates were open. Therefore, if the sediment overlying the buried soil on Island 317-Site H is indeed post-dam, it may represent the major increment of sediment that will be deposited at this site for many years and that the sedimentation rate of 190cm per 100 yrs can be expected to decrease with time. Also, the fact that seven of the 13 largest historic floods have occurred during post-dam time (Table 2) supports the supposition that the accumulation rate is abnormally elevated. These points do not, however, preclude the fact that following dam closure, rapid sedimentation occurred throughout the pool. And while the calculated sedimentation rates are most likely greater than the rates currently active in the pool, they are quite valid when used to estimate short-term sedimentation. The four decades since dam closure may incorporate both the initial rapid deposition due to pooling as well as massive flood deposition as represented by the aluminum foil evidence presented in a later section. The 190cm per 100 years rate may indeed still be in force in certain areas within the pool.

One last piece of evidence demonstrating the historic nature of the overlying sand is that at a depth of 35cm below the surface, and 30cm above the buried soil, a piece of aluminum foil was found embedded 5 to 10cm into the bank (Fig. 10). The foil was heavily weathered and fragmented easily. It lay very close to a textural boundary evident in Figure 10. The upper 40cm of the overlying sand unit tends to have a higher frequency of organic lenses containing shell fragments, while the lower 40cm of the unit tends to have thicker organic lenses with a lower proportion of shell fragments. The upper 40cm unit also exhibits some cross-bedding at 45 degrees to the underlying unit. This suggests that the overlying sand unit of 80cm was deposited during at least two episodes, each depositing sand of similar size and quantity. The upper unit's cross-bedding may reflect a flood episode in which the beach ridge crest was not totally inundated so that wave action washed material over the crest perpendicular to the crest. The majority of the sand is laminated parallel to the crest suggesting river flow deposition. The cross-bedded unit could also represent the waning stages of a major flood in which the ridge was

TABLE 2

STREAM GAUGE DATA FOR HISTORICAL FLOODS,
ILLINOIS AND MISSISSIPPI CANAL LOCK 32
(U. S. CORPS OF ENGINEERS 1981)

Rank Order of Flood Magnitude	Flood	Reading (ft)	Probable Depth of Water Over Shell Midden Site (ft)
1	1965	563.75	6.75
2	1952	559.85	2.85
3	1975	559.61	2.61
4	1951	559.55	2.55
5	1973	559+	2.0+
6	1967	558.50	1.50
7	1920	558.35	1.35
8	1922	558.35	1.35
9	1974	557.70	0.70
10	1944	557.65	0.65
11	1938	557.20	0.20
12	1916	557.15	0.15
13	1897	556.05	-0.95

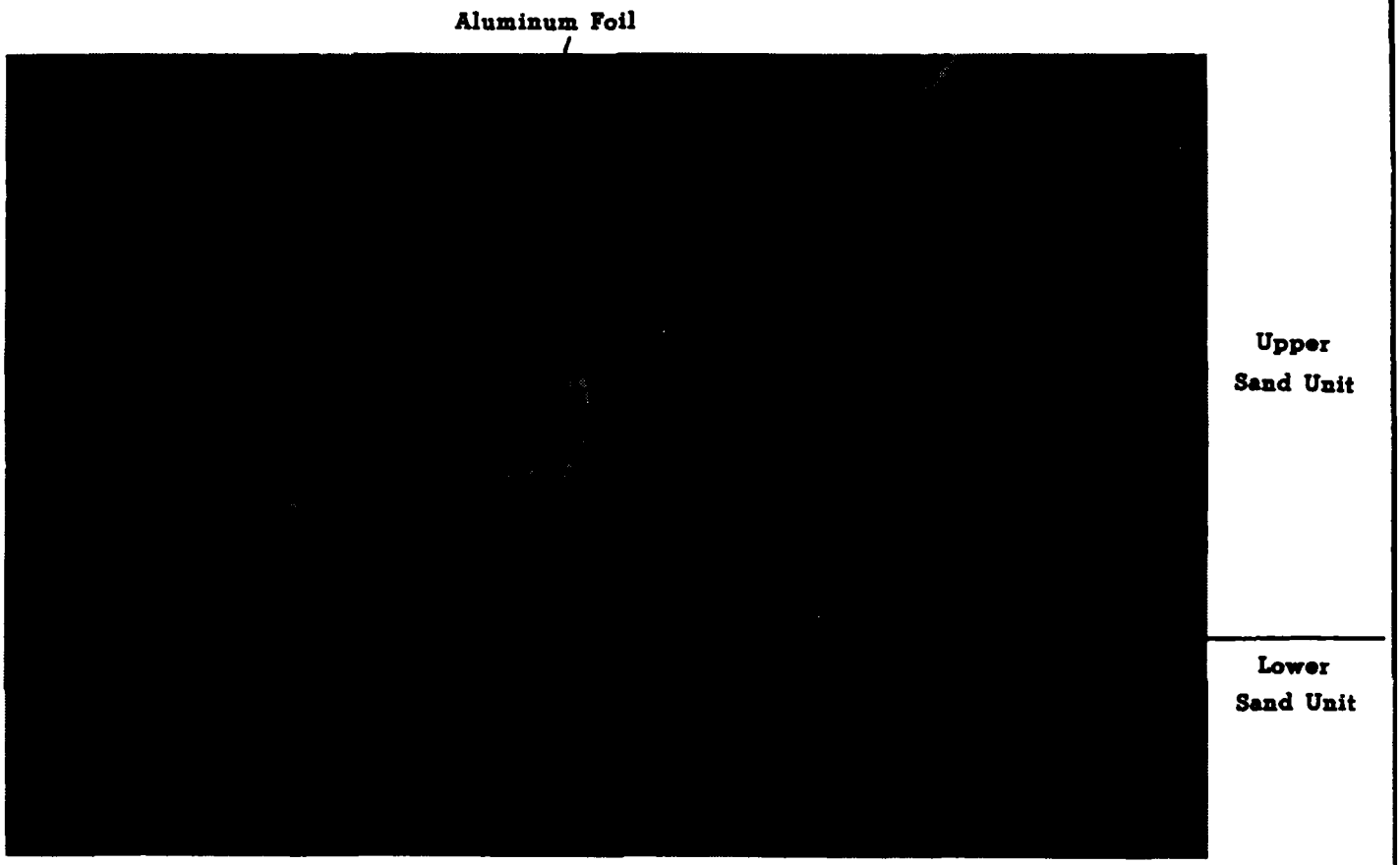


Fig. 10. Aluminum foil buried by 35cm of recent alluvium at Site H. Foil is at hilt of knife. Note shell frequency of upper sand unit relative to sand unit beneath unit. Trowel at lower left is embedded in buried soil. See also Fig. 7.

exposed after having been inundated. In either event, the probability is high that at least the upper 40cm of sand is of recent origin; that it may represent a major flood is suggested by the thickness of the unit.

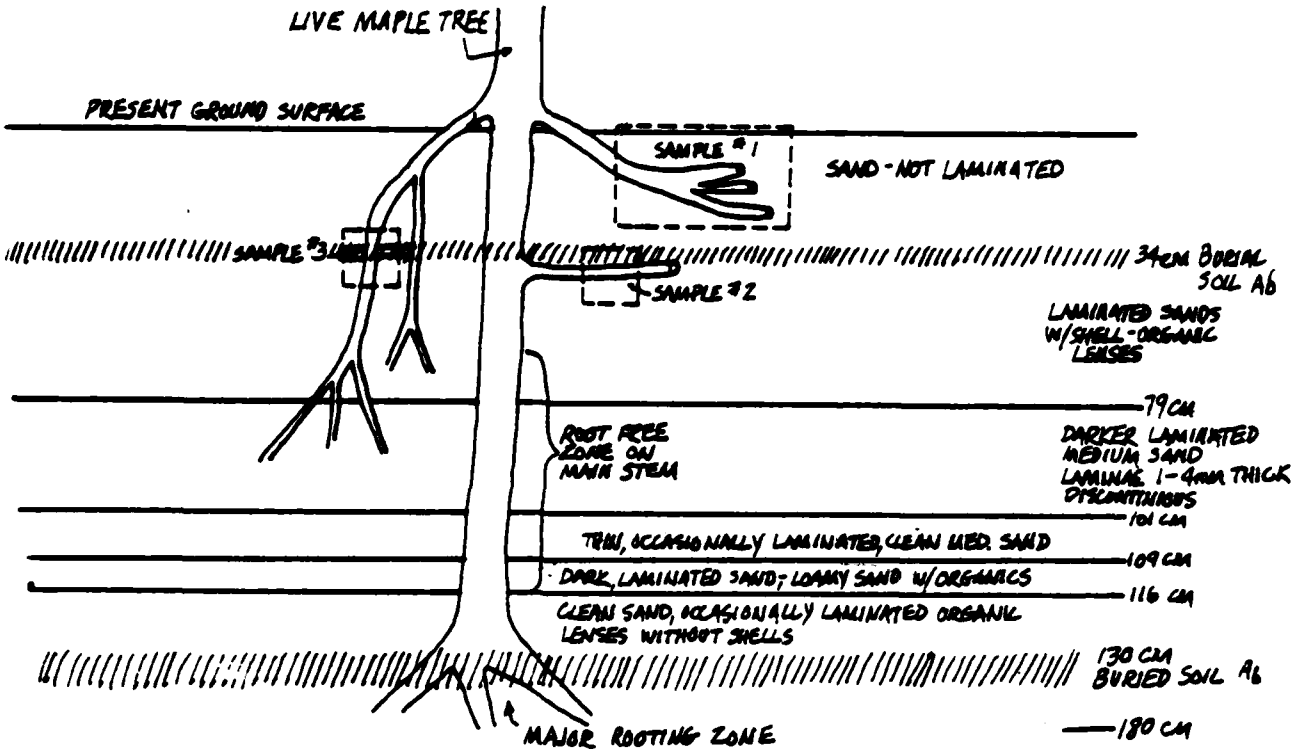
Island 317 Bank Exposure (Site J)

At this site, at approximately river mile 474, there is evidence of both sedimentation and bank erosion. Figure 12 shows the relationship of the interlayered organic units with the distinctively coarser-textured sand units. The major buried soil is at 130cm, with a significant organic zone (possible buried soil) at 34cm. These two zones are important because they represent areas of major root development at this site. Major buttress roots have developed within the 34cm unit, while large rooting structures occur within the 130cm buried soil. A dead American elm at the site, rooted in the 130cm buried soil, illustrates the relationship between the buried soil and the buttress roots that were produced to stabilize the tree (Fig. 9).

LaMarche (1961, 1963, 1968) used exposed buttress roots to calculate erosion and sedimentation rates in the White Mountains of California. In this study, the maple tree whose roots were being exposed produced additional roots to compensate for the undercutting that was occurring around its base. Several cuts were taken and the rings counted with the intent of determining the age of the various roots. In Figure 13, it is obvious that there have been several episodes of rooting in this tree's life. Figure 11 graphically illustrates the tree trunk illustrated in Figure 13.

A ring count of Sample 1 revealed that the sediment in which it occurred was deposited at least 12 years ago (1970) because the point of sampling was not at the interface with the main stem. Since this root is presently above the ground surface, and such roots do not develop aboveground, the ground surface has been lowered about 10cm since the root's inception. As the bank exposure is rapidly eroding at this site, the erosion has taken place since about 1970. This root is entirely within the upper sand unit and above the 34cm buried organic layer which suggests that this organic layer is possibly the pre-1965 surface and that the upper sand unit was emplaced by subsequent floods.

Sample 2 supports the explanation given above. The ring count for this root is at least 18 years giving it a date of 1964 for its initiation. Since the sample was taken about 30cm from the stem, the root may have been initiated as early as 1960 or 1962.



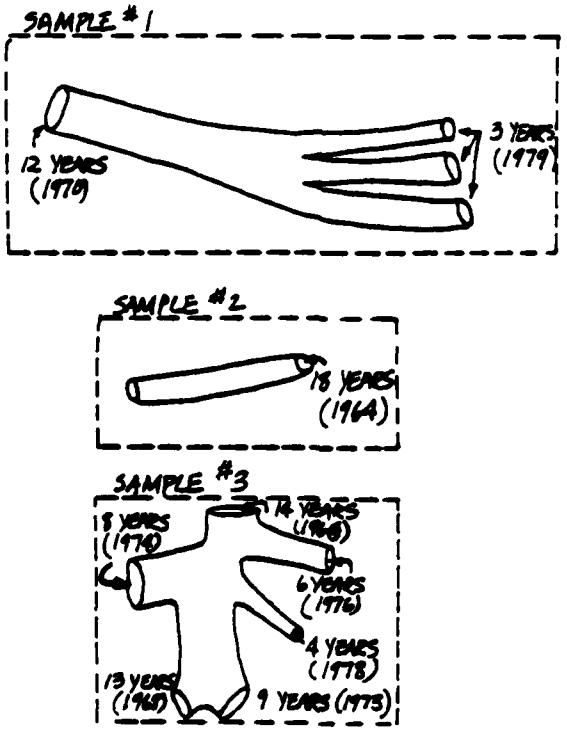


Fig. 11. Buttress root ages and relationships with sediments.

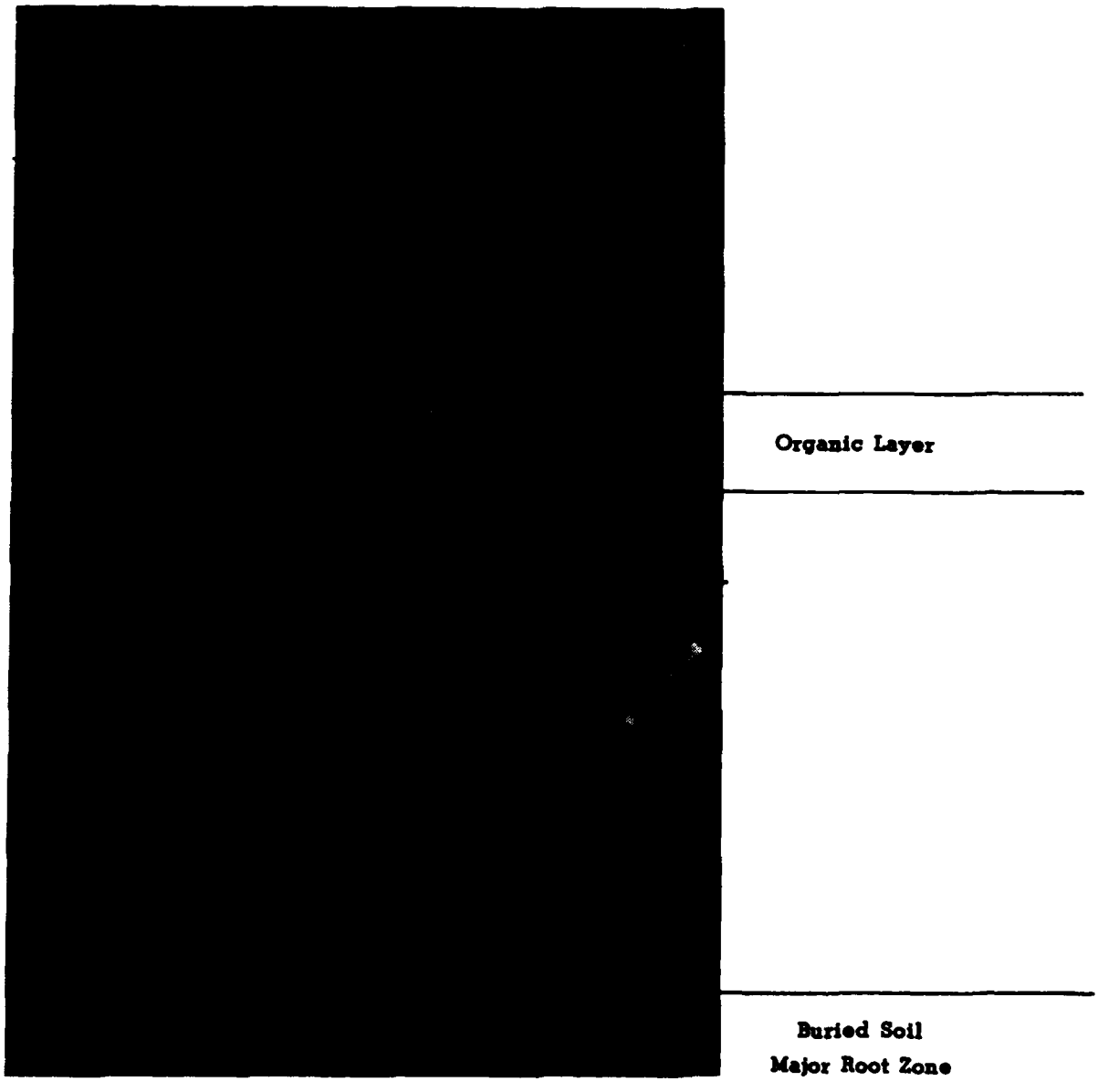


Fig. 12. Site J stratigraphy. Organic layer at top of shovel handle is 34cm unit discussed in text.

Fig. 13. Root network sampled at Site J. Tree-ring analysis prcvides basis for estimating erosion and sedimentation rates. See Fig. 11 for diagram of site stratigraphy.

Sample 3 is a complex unit which is definitely related to the undercutting of the bank. The horizontal extensions are too young to date the 34cm organic layer closely, but the bottom left extension suggests increasing instability around 13-15 years ago (1967-69), much the same as Sample 1. The patterns outlined in all three samples support the observation that any cultural resources along the margins of the islands are being subjected to severe, continual impacts.

The main stem of the tree shows no signs of major lateral root development between 34cm and the 130cm buried soil in which it is rooted. The nearby dead American elm tree trunk is buried about 117cm below the present ground surface where it displays rooting structures within the 130cm soil.

The laminated sand with organic and shell lenses is similar to that found at Site H, and the two deposits most likely correlate with the same geologic event or events. With few exceptions, Sites J and H exhibit similar depositional and erosional histories. The 130cm buried soil at Site J correlates with the 80cm soil at Site H.

Island 317--Gas Station Site (Site P)

This site (at approximately river mile 475) provides evidence for historical sedimentation since 1933. In that year the Natural Gas Pipeline Company of America installed a small tube-frame structure at the site to support a pump mechanism. The six support posts had small triangular extensions at their ends which were embedded in concrete. At the time of our visit in 1981, the legs were buried by 41cm of sediment, of which the upper 30cm was laminated and undisturbed. Figures 14 and 15 illustrate this relationship. Given that two thin, fine sand lenses extend from at least 50cm to the left of the post up to the post in an undisturbed plane, the sediment must be younger than the date of the post's installation. As the facility was constructed in 1933 and 30cm of sediment has been deposited since then, the rate of deposition has been 62.5cm per 100 yrs. This high rate is about 30 percent of that projected for Site H based on the depth of the buried soil zone. This gas pipeline facility establishes the geomorphic surface as of 1933 and, therefore, provides a precise measurement of the length of time this site was exposed to sedimentation. Thus, while the assumptions made for the buried soil at Site H (i.e., that the soil is modern or pre-dam) might be challenged along with its extremely high rate of sedimentation, the closely dated and relatively simple geomorphic gas station site provides a sound basis for calculating sedimen-

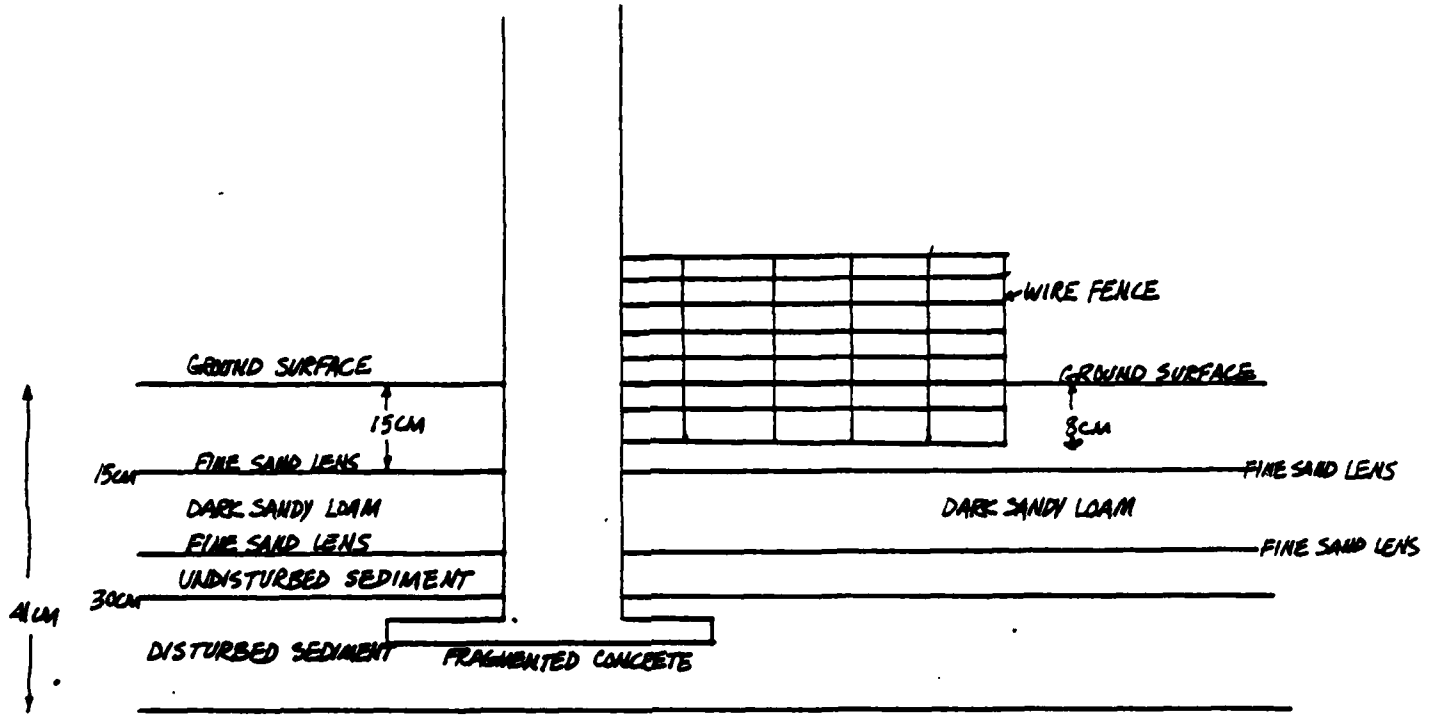


Fig. 14. Gas Station stratigraphy.

Fig. 6. Texture and horizon data for bank exposure Site H.

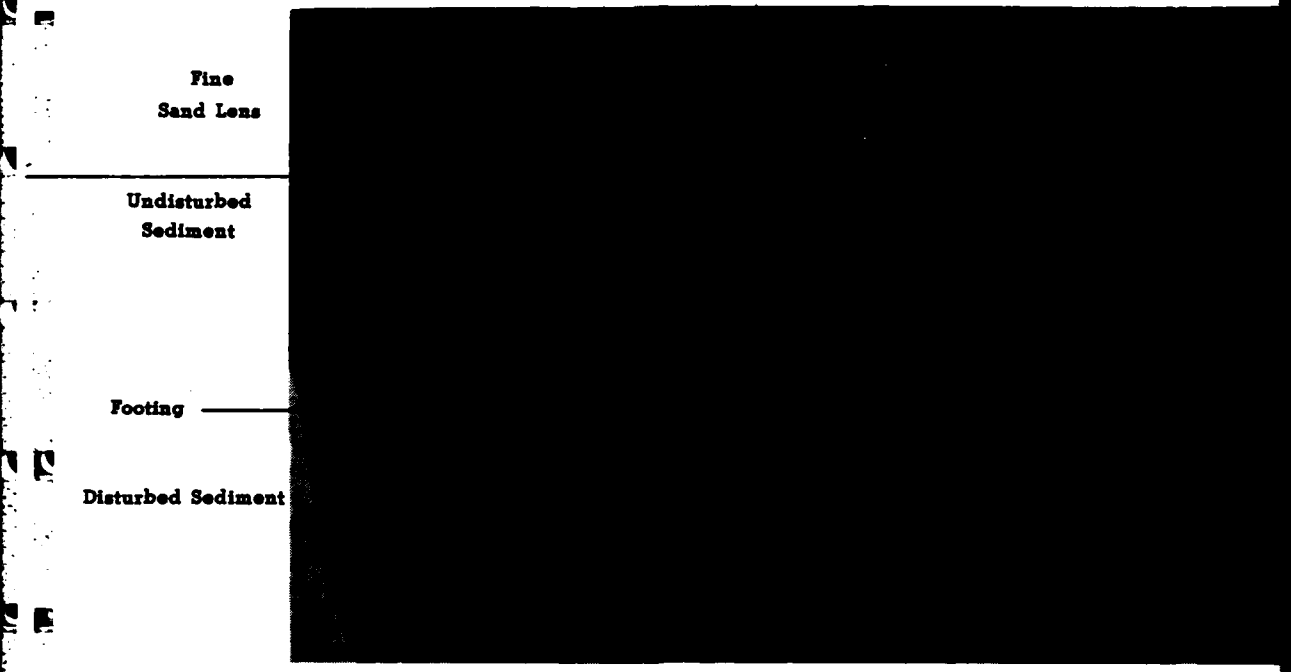


Fig. 15. Gas Station Site F. Trowel marks sand lens. Footing of structure is exposed in lower center of photo. Structure was constructed in 1933 and is buried by 30cm of laminated alluvium.

tation rates, and the fact that the rate is quite high, 62.5cm per 100 yrs, tends to support the data from Site H.

Island 317--Bank Exposure (Site G)

This site (at approximately river mile 474.75) is included to illustrate the variability of sedimentation encountered on Island 317 and at other sites. Figures 16, 17, and 18 are of two places only one meter apart, yet they show rather different patterns for the upper 63cm. The lenses can be seen to vary in thickness laterally as well as vertically. Such variability on a single island can be extreme, making correlations with other islands difficult where line-of-sight correlation with Island 317 is not possible. Shell fragments and distinctive buried organic units provide some stratigraphic control. Site G profile information is presented in Figures 19 and 20. The buried soil at 83-120cm is correlated with that found at 80cm at Site H and at 130cm at Site J.

Island 318 is a very small island separated from Island 319 by a shallow slough. This slough is filling in, and although the island's shoreline was surveyed by boat, considerable difficulty was encountered in navigating the slough. The shoreline was covered with vegetation along the downstream end of the island, while the upper end was more eroded. Visibility along the island's shoreline varied from 0 to 80 percent, depending on local conditions. No archeological sites were located on Island 318.

Island 319 also was surveyed by boat. There are sandy beaches with picnic spots along the Iowa side, and the island appears to receive heavy use by boaters from Buffalo and Andalusia. The slough between Island 319 and Andalusia Island is a major thoroughfare for boats between Andalusia Slough and the main channel of the Mississippi River. Much of the area along the shoreline was walked (Fig. 5). The island was thickly covered with vegetation and surface visibility ranged from zero to approximately 20 percent. No sites were identified on this island.

The north end of Andalusia Island is located in Area 1. The entire shoreline was surveyed by boat, and its northern end and the Illinois side were walked. The northern shoreline is riprapped to reduce erosion. The ground cover was very dense, with a surface visibility of zero to 40 percent. Three places--designated L, M, and N (Fig. 5)--were probed with a soil core. No archeological sites were found on this part of Andalusia Island.

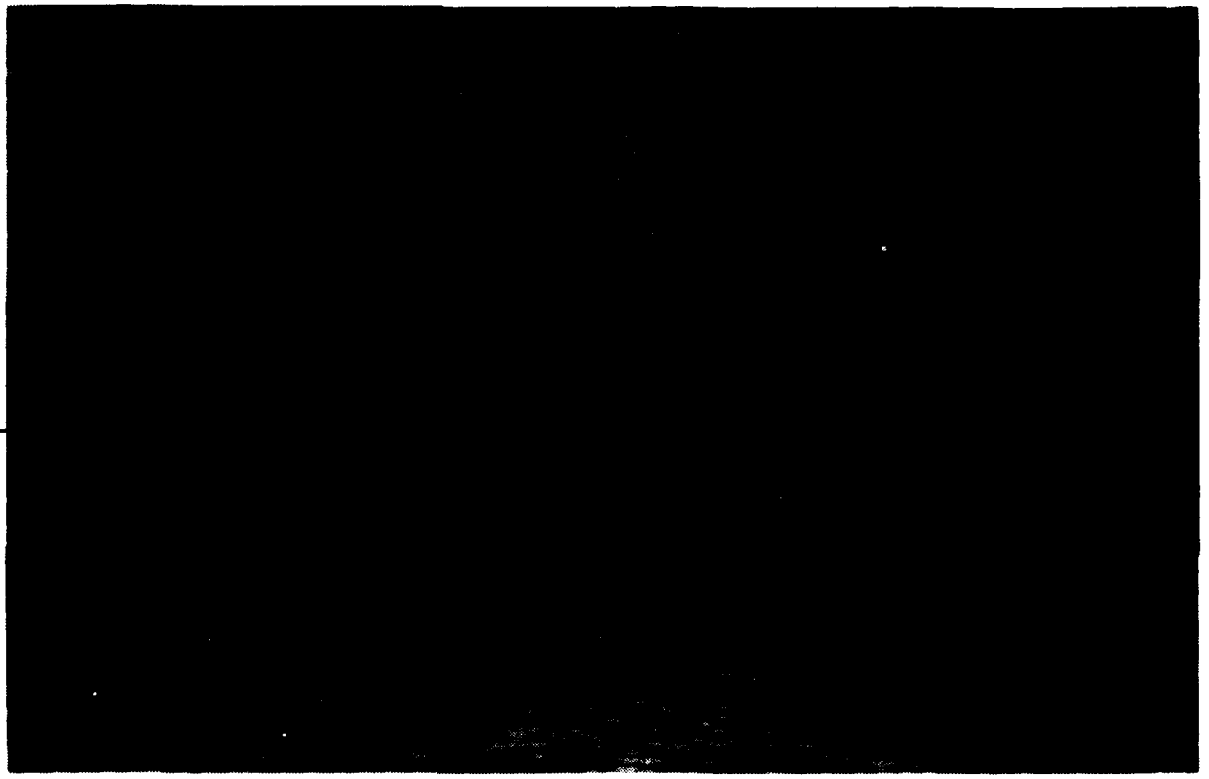


Fig. 16. Site G stratigraphy. Note variability between adjacent sites.

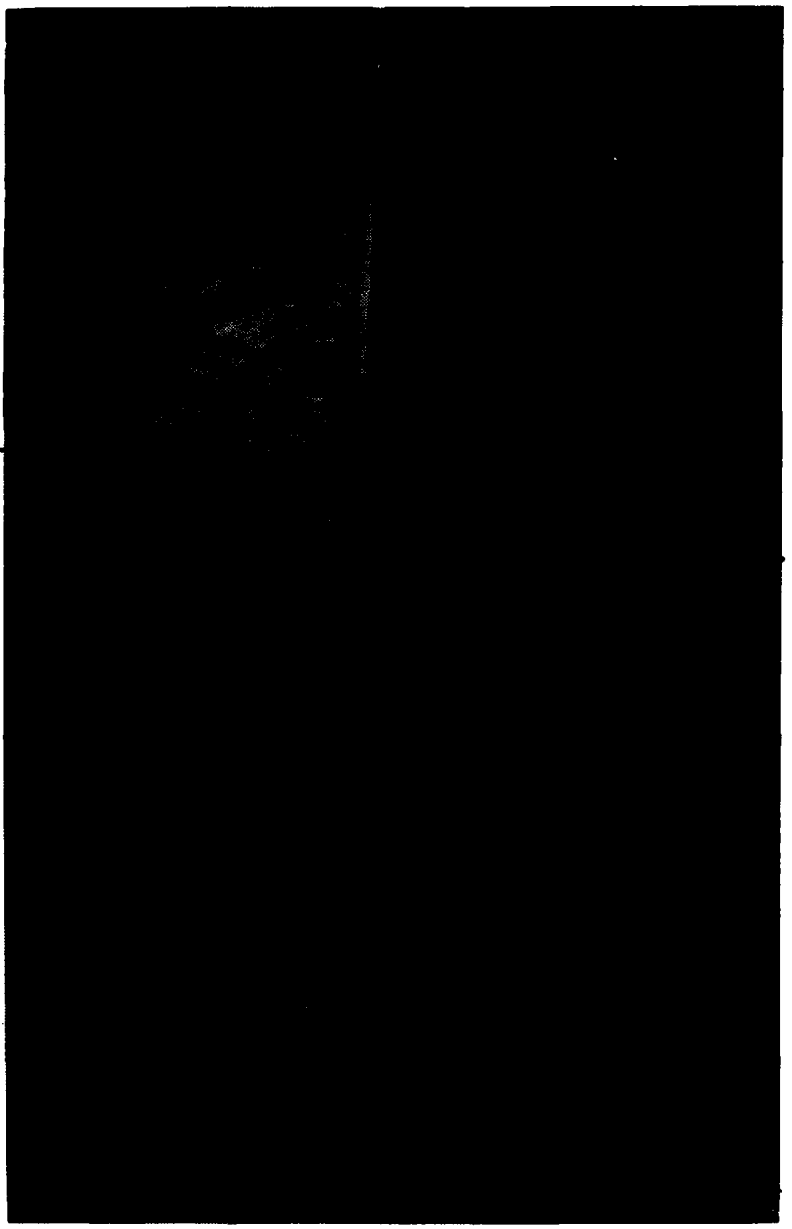


Fig. 17. Close up of left exposure at Site G, showing recent sand unit.

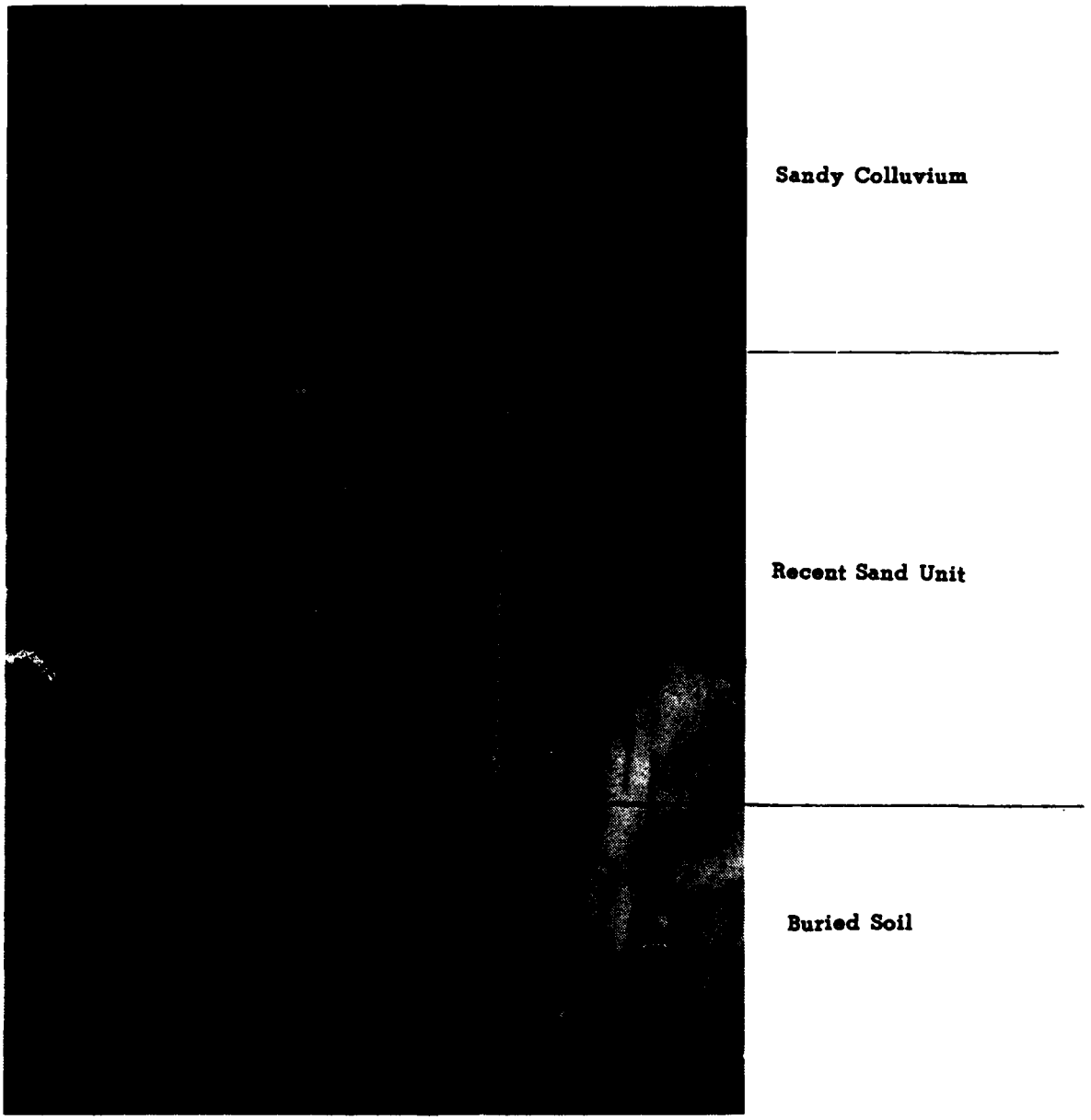


Fig. 18. Close-up of right exposure at Site G. Knife is inserted into buried soil.

Figure 19 Stratigraphy of Site 6 on Island 317.

Depth (cm)	Surface
	10YR 5/4 organic unit; abundant roots; sand-loamy sand
12	clean 10YR 6/1 sand, some discontinuous, irregular organic lenses
25	10YR 5/4 organic-rich sandy loam-loam
32	clean sand with organic lenses with shell fragments
43	10YR 5/4 organic lens
46	clean sand with organic lenses with shell fragments
52	laminated sand, some reddish 10YR 5/6-5/8 colors
65	interlayered organics and sand layers are discontinuous and irregular
83	organic-rich sandy loam 10YR 3/2-4/2 roots common, not stratified, root filling, apparent cinders found about 30cm below top of soil, medium sand at base of unit; mole activities; Buried A_1 - (Buried soil)
120	increasing sand-medium sand massive; roots common; lower boundary contorted and irregular 3cm wide tongues; mole and shrew activity; contorted lower boundary
130	clean sand lens
140	Buried soil? 10YR 3/2; reduced silt loam-loam; very friable; massive slightly sticky
165	core sand unit?

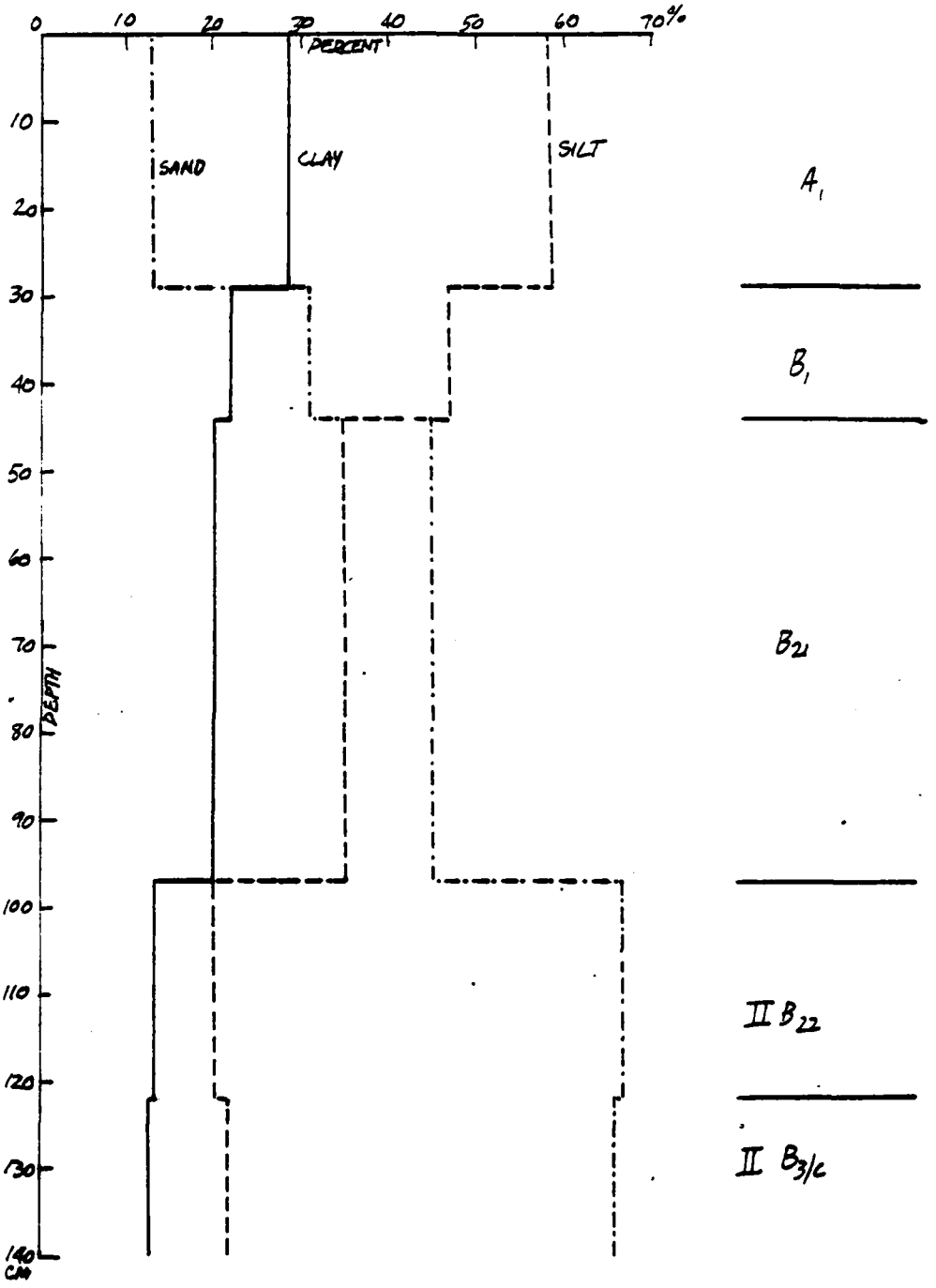


Fig. 20. Texture and horizon data for Site G, Andalusia Island.

ILLINOIS SHORELINE

In sharp contrast to the Iowa shoreline, the Illinois shoreline is relatively undeveloped. The Corps of Engineers' property begins at the upper end of Area 1 at the Upper Mississippi River Wild Life and Fish Refuge (Fig. 5). This property was difficult to survey because many old sloughs still contained water, and there are also many ridges and low places covered with forest growth and nettles. This vegetation restricted surface visibility to 30 percent or less.

The shoreline along the Illinois side was surveyed by boat, from the Interstate 280 bridge to the south end of Area 1. Wreckage that had washed ashore was observed not far from the soil trench excavated by Barnhardt (B, Fig. 5), but this wreckage did not appear to be part of a boat. No documentary evidence of a wreck at this locale could be found, nor was field evidence found for four steamboat wrecks suspected to be within the Pool 16 area (Peterson 1978:4-1). Lack of precise locational data made survey for these wrecks a hit-or-miss proposition. The Kahlke Boatyards, which in the dry days of August 1980 revealed a surviving bonanza of early steamboat remains (Wundrum 1980), is likewise outside the pool area.

The shoreline along this section slopes gently down to the water. Tree roots, driftwood, and sand make surface visibility poor--zero to 50 percent. Several areas at the intersections of creeks near Andalusia, Illinois, were surveyed on foot (Fig. 5) but no sites were located. The boat access area at Andalusia was supposed to have been an important mussel processing area (Kenneth Finley, personal communication), but dredging of the harbor here appears to have buried or destroyed this site.

The large floodplain meander between Turkey Hollow Creek and Mill Creek was formed through the combined action of the Mississippi and Rock Rivers. The sediments have been reworked into prominent beach ridges, levees, point bars, and longitudinal bars that have been further modified by episodic erosional and depositional events. It appears that the majority of the large longitudinal bars were once part of the mainland and have become islands through lateral migration of the river.

Comparison of the 1892 map produced for the Mississippi River Commission with the GREAT II map reveals that much of this area was separated from the mainland by small active chutes in the 1890s. A major chute about 1.2-1.6km (inland) from the present riverbank appears to have been quite active, as was the slough immediately adjacent to the beach ridge that was trenched for this study. Extensive accretion

has occurred in these chutes and sloughs since 1892, while smaller channel islands near Islands 317 and 318 have been totally removed. Clearly, the parallel, concentric pattern of beach ridges/bars in the Mill Creek area suggest an accretionary process wherein successive river positions created these features.

The proximity of the Rock River has most certainly played an important role by supplying copious amounts of sediments for redeposition in this area. Two buried shell middens were examined and a beach ridge was trenched to clarify the geomorphic history of this area.

Mussel Beach Site

A shell midden--Mussel Beach Site (Location A; 11-Ri-506)--averaging some 20cm thick was discovered approximately 80cm below the surface while a soil pit was being excavated (Fig. 21) at the highest elevation on the active floodplain (about 557ft above mean sea level, or 12ft above normal pool). This site was designated archeological site 11-Ri-506 (Fig. 5) and is located at approximately river mile 477.25. All the cultural material seems to be contained in a 15cm-thick lens 50cm below the present ground surface. None of this material was diagnostic, but on the basis of our radiocarbon date of 5680 ± 75 BP (ISGS-829) the site is of Archaic cultural affiliation. In this lens were numerous mussel shells, bone, firecracked rock, and burnt sandstone and limestone.

Van Dyke, Overstreet, and Theler (1980) have suggested that the presence of sandstone in a shell midden in this area is considered significant in that it is not locally available. Although this may be true of the site they were reporting, this seems contrary to our observations in the fact that St. Peters and Gunter sandstones are reasonably close at hand, not more than a mile or two distant. Sandstone and limestone both would have had to have been brought to the site from an equal distance and would have represented an equal expenditure of energy. It is well known that hunters and gatherers ranged far and wide in their exploitive rounds. A distance as great as 10 miles does not seem excessive for the procurement of many items. Resources within this area should not seem unusual or exceptional when found on sites.

This high place, only about one acre in size, is surrounded by an extensive beach ridge complex having elevations of 552 to 555ft. These linear ridges run essentially parallel to the present channel at a distance between 0.4 and 1.6km (0.25-1.0mi) from the riverbank. The entire area lies between the river and a slough believed to have

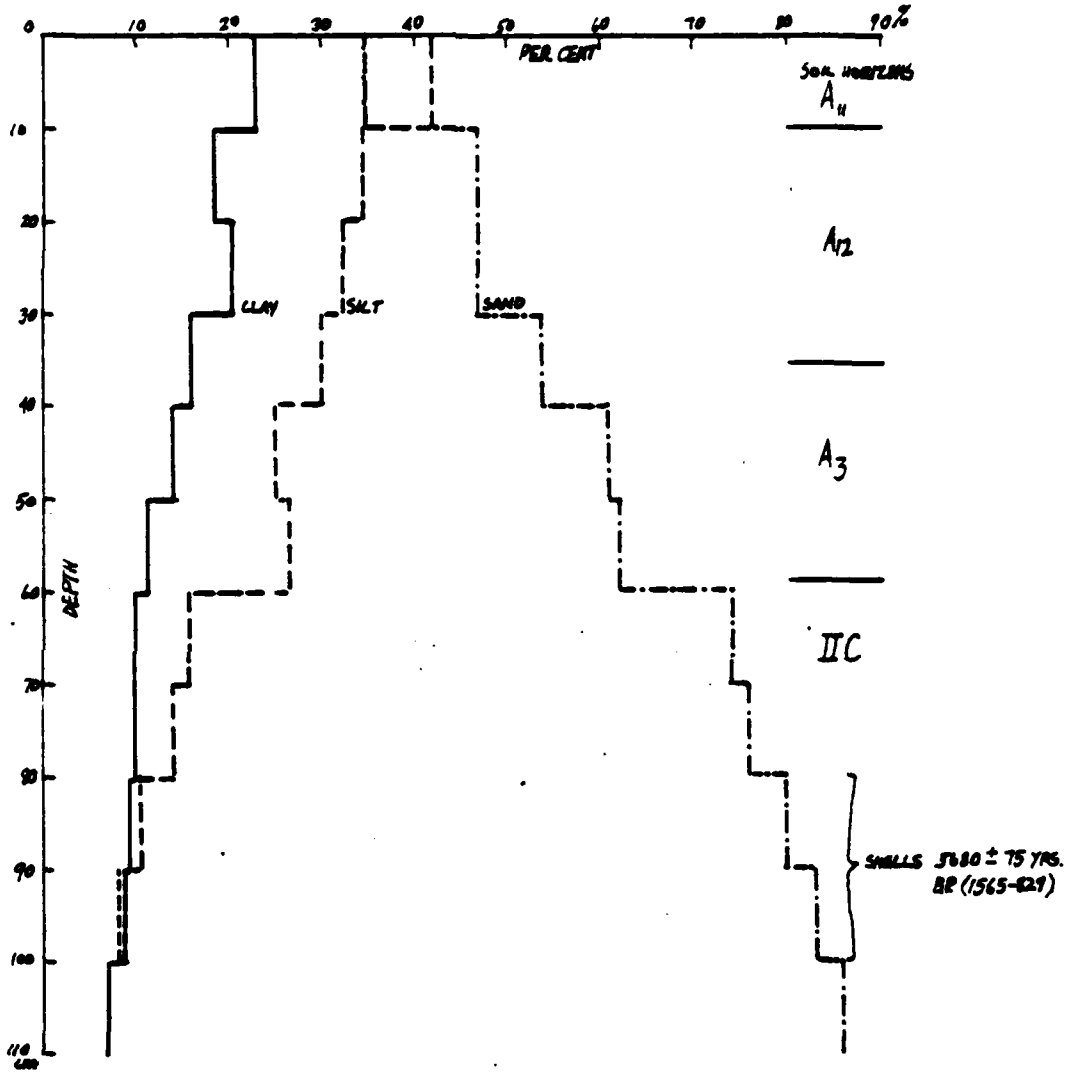


Fig. 21. Texture and horizon data for Mussel Beach Site.

been active in the 1890s. Many of the intervening sloughs contain water during much of the year as the result of backwater activity rather than active throughflow similar to that experienced in the 1890s. Judging from river gauge records dating from 1896, the highest point appears to have been inundated 12 or 13 times since that date (United States Army Corps of Engineers 1981).

Table 2 presented these gauge data for the Illinois and Mississippi Canal, Lock 32, about 2.6km (1.6mi) upstream from the Mussel Beach Site. Flood No. 13 was included because the contours indicate only that the site is above 556ft, although field interpretations suggest an elevation of about 557ft.

The mussel shells found at a depth of 80cm yielded a radiocarbon date of 5680 ± 75 BP (ISGS-829). Although shell-derived radiocarbon dates are normally accepted with some hesitation by the archeological community, appropriate laboratory procedures for shell-based radiocarbon analysis carried out by the Illinois State Geological Survey inspire confidence in this data. Additional confidence is supported by cross-dating of organic matter in a geologically related context (Table 1). Details of all radiocarbon analysis are presented in Appendix IV. Since the shells occurred very close to a major texture boundary, interpreted here as a transition from an active beach ridge to a backwater area receiving sediment during flood episodes, the date represents a significant geomorphic change. Projected upwards, this site has accumulated sediment at the rate of 7.1cm per 100yrs. This sedimentation is most likely episodic but, given the position of the Rock River immediately upstream, large volumes of sediment are readily available for deposit. A rather large increase in sand occurs at a depth of 10cm and again at 30cm. Earthworm activity appears to have masked evidence of recent sedimentation, but these textural breaks are curious, especially in light of the structural changes found near these boundaries. Table 3 presents the profile description data for this site and Figure 21 presents the texture-horizon data. A brief analysis of the shells was prepared by Stan Riggle (Appendix III).

A second site, 11-Ri-507, was located during a survey along the boundary between Corps property and adjoining private property as part of a permit survey carried out concurrently with the Pool 16 survey. Two 1m-by-1m squares were excavated to a depth of 80cm to 1m below surface, and one of them revealed a buried shell midden similar to 11-Ri-506. Although no diagnostic artifacts were located, the site is so similar both as to the types of material found and its geomorphological location to Site 11-Ri-506 that this site is felt also to be of Archaic cultural affiliation.

TABLE 3

PROFILE DESCRIPTION OF MUSSEL BEACH SITE
(Munsell colors are moist)

A1	0-10cm.	Black (10YR 2/1) loam; moderate medium granular structure; no coatings or mottles; frequent roots; abundant earthworm fecal pellets; friable (moist), 4.2% organic matter; pH 7.6, mildly alkaline; snail shells abundant; gradual smooth boundary.
A2	10-35cm.	Very dark grayish brown (10YR 3/2) loam; moderate coarse granular with weak fine subangular blocky structure; occasional roots; fecal pellets common; friable (moist), 3.0% organic matter; pH 7.3, neutral to mildly alkaline; snail shells common; gradual smooth boundary.
A3	35-50cm.	Dark yellowish brown (10YR 3/4) sandy loam; weak fine subangular blocky; large filled earthworm tunnels 2-5mm in diameter; abundant fecal pellets; very friable (moist); 1.1% organic matter; pH 7.5, mildly alkaline; clear smooth boundary.
IIC	50+cm.	Dark yellowish brown (10YR 4/4) sandy loam to loamy sand; single grain; some tunnel fillings; mussel shells at 80-100cm; some fine discontinuous charcoal flakes; some artifacts recovered from shell unit; 0.2% organic matter; pH 7.6, mildly alkaline.

Remarks

The soil pit was on a topographic high point (557ft) under maple, ironwood, oak forest with nettles as ground cover. Snails were very abundant near the surface, and earthworm burrowing promoted the development of gradual horizon boundaries. Shell samples were taken from the buried mussel shells and radiocarbon dated 5680 $\pm$ 75 years BP (ISGS-839).

A third site, 11-Ri-157, was visited, but no surface collections were made since it was outside the Corps' property. This site, like Sites 11-Ri-506 and 11-Ri-507, is situated on the 550-foot contour and is an Archaic site.

Beach Ridge Site

The Beach Ridge Site (Location B) is a ridge fronted by a seasonally active slough, about 600m southwest of 11-Ri-506. Historical evidence strongly suggests that the slough was active within the last 80 years (the slough reenters the river within 40m of the trench). The site is at approximately river mile 477. The ridge was trenched to examine the depositional history of a ridge known to have been recently active.

The distinctive depositional pattern exhibited here suggests several episodes of slough-ridge activity within the last 3800 years (Fig. 22).

Organic-rich sand from a depth of 150cm was radiocarbon dated at 3760 ± 75 years BP (ISGS 842). These organics are believed to have been deposited in a slough much the same as the slough that is nearby today. Three additional organic units overlie this zone, but the top 50cm of the profile exhibit increasingly cleaner sand with only occasional thin, discontinuous, organic lenses (Figs. 23 and 24). The top 50cm also display well stratified sands unlike lower sand units, suggesting a change in depositional processes. A more unidirectional mode of deposition is probable, with at least some of these laminated sands being of historic age. The upper 25cm exhibits stratification and thin discontinuous organic lenses very similar to several channel island beach ridges on which strong evidence for recent sedimentation exists.

Swale Site

The Swale Site is just inland from Site B, about 200m from the river and 75m from the beach ridge trench, at a swale or inactive slough about 551 or 552ft in elevation. The swale is a major depression running parallel between beach ridge sites A and B on which the shell midden and trench were studied.

Investigation of this site provided insight regarding slough deposition; a review of the profile description and texture profile illustrates the results (Table 4; Fig. 25).

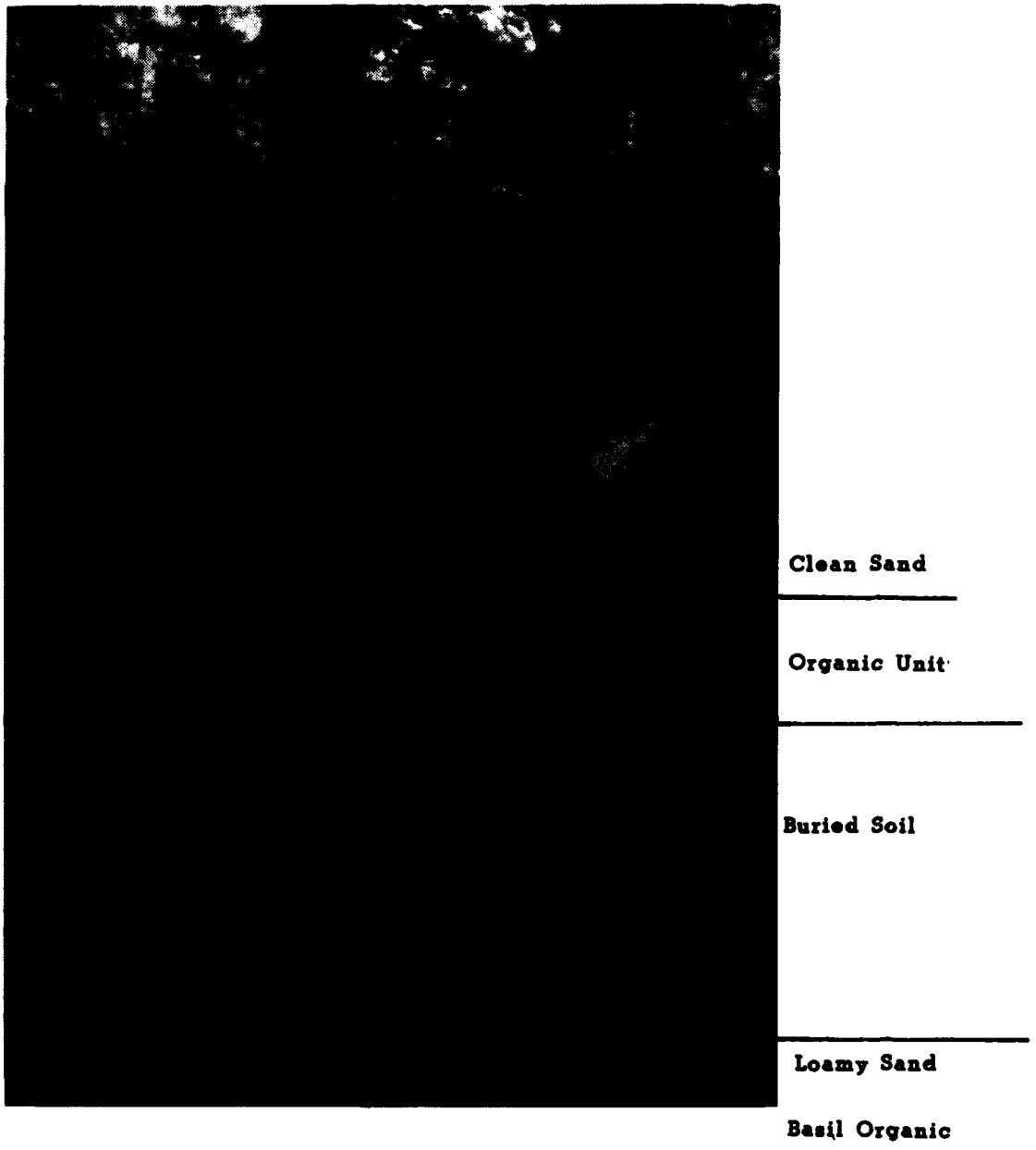


Fig. 22. Beach ridge trench (Site B). Base of trench is at 150cm. Basal organic layer dated at 3760 ± 75 yrs. B.P.

Figure 23 Diagrammatic description of Beach Ridge Site B. (Munsell colors are for moist samples)

Depth (cm)	Zone
0	A clean medium to fine sand; some thin discontinuous organic layers less than one cm long; 10YR 4/4, thickness varies along beach ridge
25	B strongly stratified medium sand and organic layers; approximately 10% less sand in organic lenses; lenses are 3-5cm thick interlayered with clean sand; 10YR 4/2
45	C organic layer, 10YR 3/2; loam; no stratification; many fecal pellets and earthworm tunnels
65	D clean medium sand; 10YR 4/4; not stratified
77	E loam to sandy clay loam; organic layer 10YR 3/2 with few fine faint 10YR 5/6 mottles
92	F clean sand lens, 10YR 3/4; not stratified
102	G organic layer, 10YR 3/2; sandy loam
114	H reddish loamy sand; reddish upper part with interstratified reduced zones of higher clay content; frequent tiny shell fragments; 10YR 3/3; organics from 160cm radiocarbon dated at 3760 ± 75 yrs. B.P.
160	

Remarks: All contacts are abrupt and smooth. Water table at 160cm. Elevation at top of beach ridge is about 552 ft. Ridge is second major ridge in from river and is separated from the river by a 10m-wide semi-wet slough that was active as late as the 1890s or later. Trench was 6m long, 1m wide and 1.8m deep extending from the crest down the distal slope. Basal organics from Zone H (160m) yielded a radiocarbon date of 3760 ± 75 yrs. B.P.

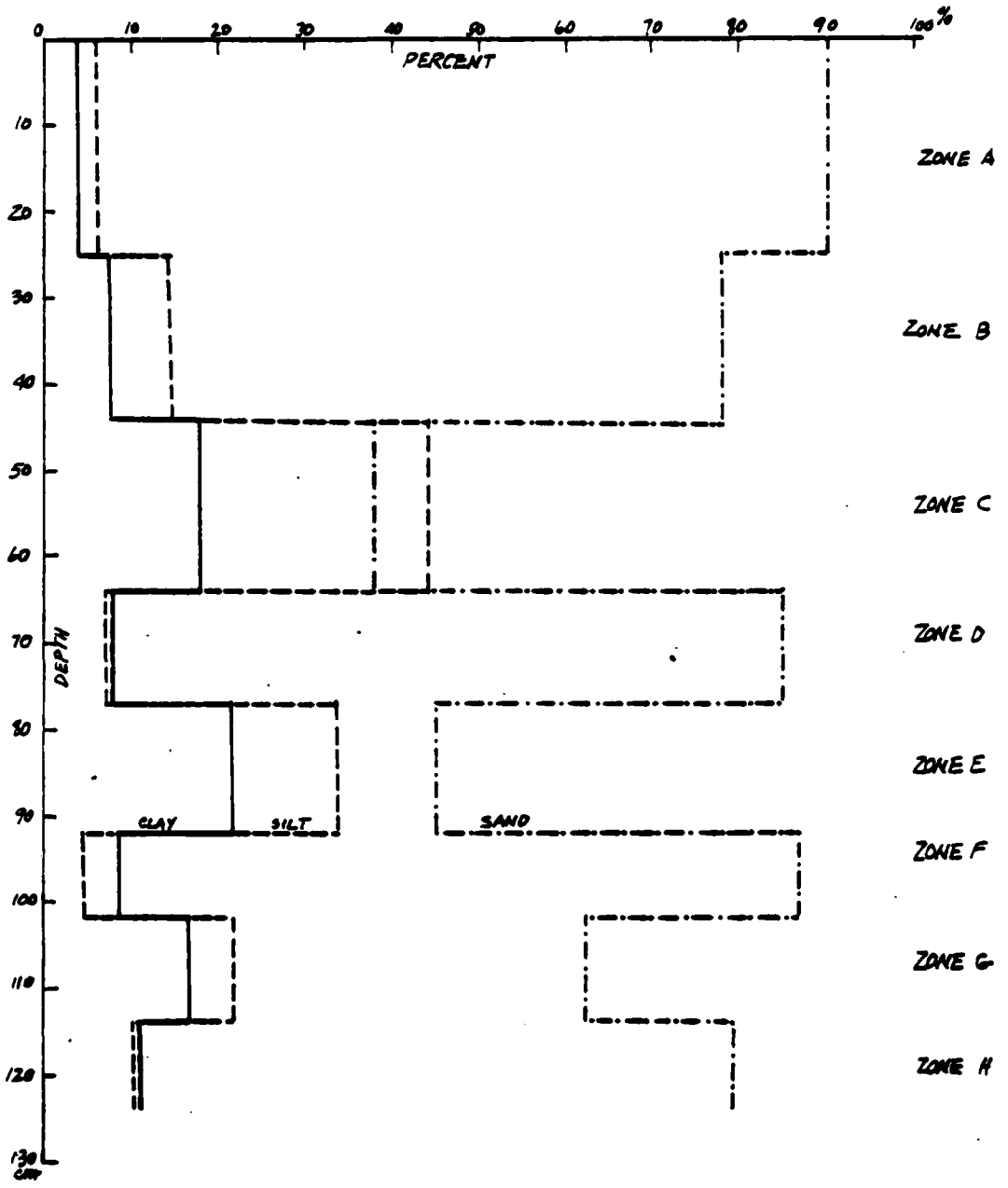


Fig. 24. Texture and horizon data for Beach Ridge Site.

TABLE 4

SOIL PROFILE DESCRIPTION OF SWALE SITE

A11	0-11cm.	Very dark grayish brown (10YR 3/2) silty clay loam-clay loam; some weak medium platy structure among moderate to strong medium to coarse granular; very friable (moist); roots abundant; some earthworm activity; calcareous owing to snail shells, gradual smooth boundary.
A2	11-24cm.	Very dark grayish brown (10YR 3/2) silty clay loam; strong medium platy structure; very friable (moist); somewhat sticky and plastic when wet; very fine sand tends to be found along plate faces; gradual smooth boundary; calcareous owing to snail shells.
A3	24-45cm.	Very dark grayish brown (10YR 3/2) silty clay loam to clay loam; strong coarse granular breaking to moderate fine to medium subangular blocky; very friable (moist); .fecal pellets and earthworm tunnels are common; occasional roots; some clay accumulations along burrow walls; gradual smooth boundary; calcareous owing to snail shells.
B21	45-65cm.	Very dark grayish brown (10YR 3/2) silty clay loam to silt loam; moderate medium subangular blocky structure; friable (moist); slightly sticky, not plastic when wet; some oxidation of organics along ped faces appears to be due to leaf decay; gradual smooth boundary.
B22	65-76cm.	Very dark gray (10YR 3/1) silty clay loam; moderate medium subangular blocky structure; friable (moist); sticky and plastic when wet; tendency to break in platelike forms owing to higher clay content; ped boundaries are slightly sandy suggesting translocation of very fine sand down ped faces; very frequent fecal pellets and tunnels; gradual smooth boundary.

TABLE 4 (continued)

B3-C	76+cm.	Very dark gray (10YR 3/1) silty clay loam; structure not present owing to saturated condition; sticky when wet; many dark brown to brown (7.5YR 4/4) coatings along tops of ped faces; peds tend to break in platelike fashion; calcareous owing to snail shells; water table at 95cm.

Remarks

Site is subject to high water tables throughout the year. Water table at current position seems to encourage clay deposition as the lower B22 and upper B3 have 4-6 percent more clay than upper horizons. Clay is quite sticky in these horizons, also. High organic input from short grasses. Site is within 30m of an active, wet slough.

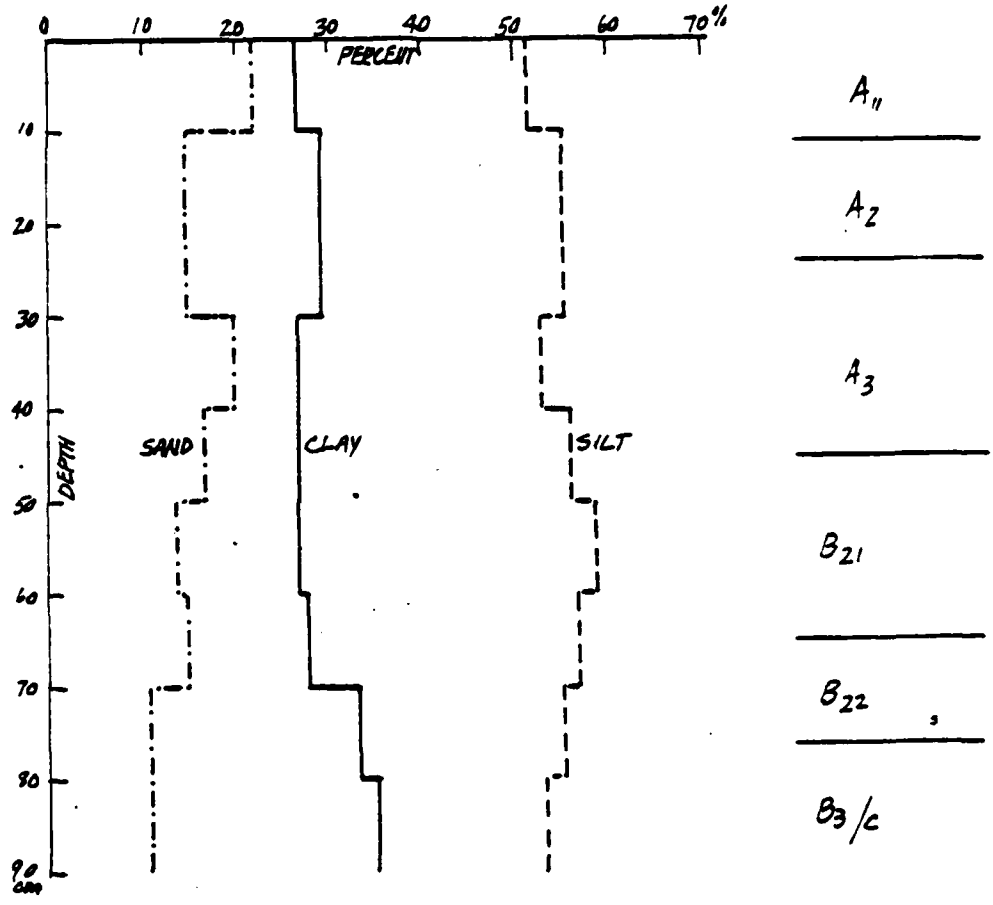


Fig. 25. Texture and horizon data for Swale Site.

SUMMARY

Two previously unrecorded prehistoric sites were located in Area 1: both were small, buried shell middens of Archaic affiliation. Associated geomorphological research helped to place the sites chronologically and to reconstruct their natural setting at the time they were occupied. Four other sites, outside the Corps property but in the Pool 16 area, also were identified as Archaic. The absence of post-Archaic sites is of interest and possibly is due to the lack of systematic survey along the terraces and bluffs outside the Corps property.

Survey Area 2
(Middle Half; approximately river miles 462 to 472, Fig. 26)

Area 2 comprises the central half of Pool 16. It contains approximately 63 miles of shoreline, of which 42.5 miles were surveyed by boat and 0.8 square mile was surveyed on foot.

Andalusia Island, with its many segments separated by shallow sloughs and chutes, dominates this portion of the river. Several bank exposures were studied in the upstream part of the island and a soil pit was excavated on an inter-island ridge along the Velie Chute.

IOWA SHORELINE

The Iowa shoreline generally has a gentle slope which is sparsely vegetated but covered with sand and litter which obscures the surface (surface visibility ranged from zero to 60%). The entire Iowa shoreline was inspected by boat, but no archeological sites were located.

A number of areas were selected for pedestrian survey. The first was at the Buffalo Shore Access Area (at approximately river mile 471.5) where 13-St-75, a surface scatter of waste flakes with no diagnostic material, was found. Another area that was surveyed lies along the shoreline behind the Occidental Chemical Company plant. Site 13-St-76 was discovered there, also with no diagnostic prehistoric artifacts.

Both sides of a small unnamed creek traversing Corps property near Montpelier, Iowa, were carefully walked by the survey crew. Thick vegetation reduced surface visibility from zero to 90 percent, making survey difficult. No sites were located there. Another area, south and east of Montpelier, was surveyed by walking down every fifth row of the

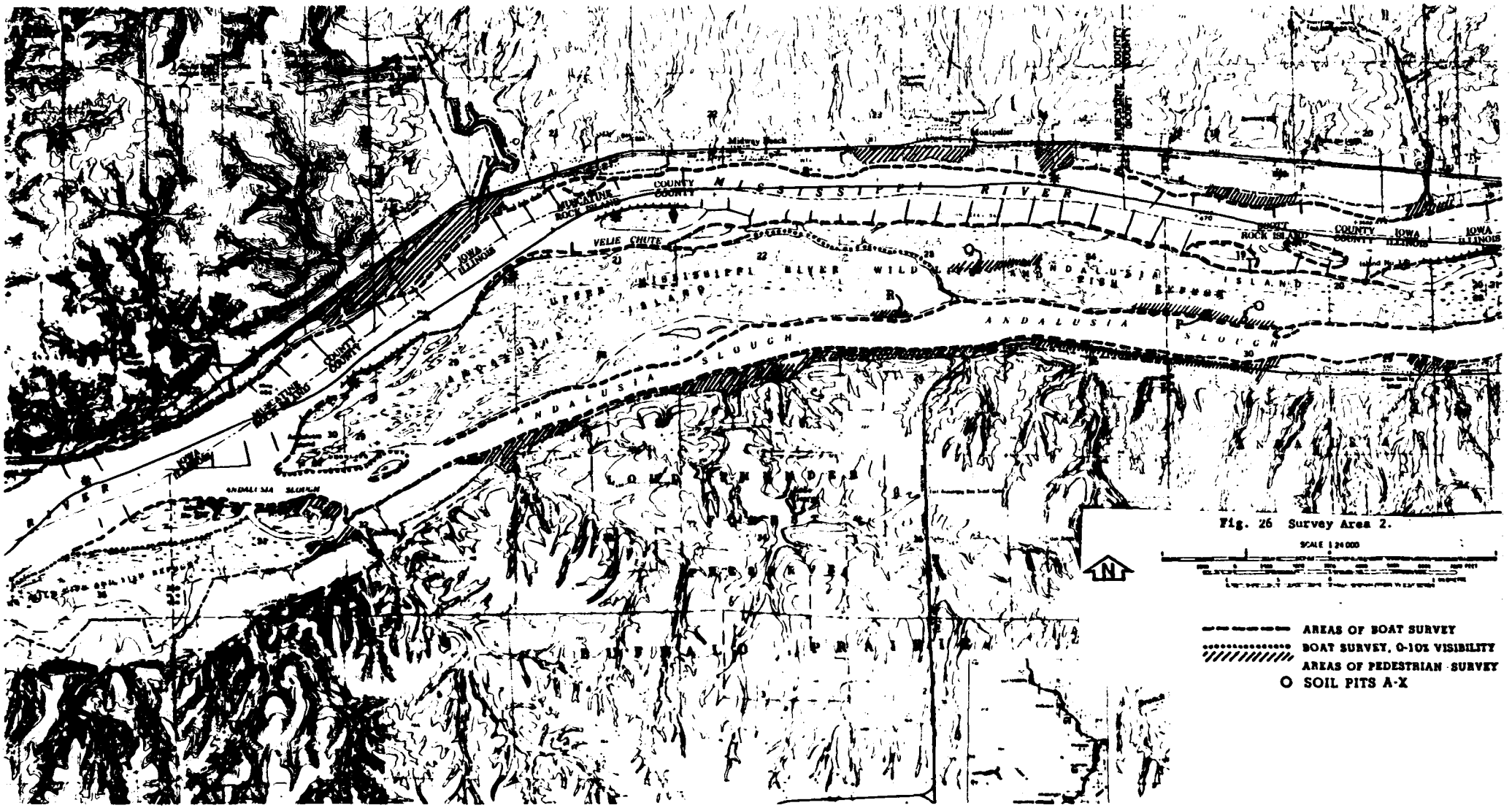


Fig. 26 Survey Area 2.

cornfield that stood there. Two sites--13-Mc-13 and 13-Mc-14--were found there. No diagnostic prehistoric artifacts were located, but historic material of the early to mid 19th century was located.

The banks of Pine Creek were surveyed above its confluence with the Mississippi, as were the terrace and floodplain to the southwest, but no cultural material was found. However, Site 13-Mc-12 was discovered in a cornfield across a small stream to the southwest of Pine Creek.

ISLANDS

Although there are a number of small islands in Area 2, Andalusia Island is the only large one and extends almost the entire length of the area. Most of Andalusia Island's shoreline and some of its sloughs were inspected by boat. The shoreline was covered with fallen trees, vines, and other vegetation that effectively masked the ground surface in most places; visibility ranged from zero to 40 percent. Several locations on the island were selected for pedestrian survey. All were covered with dense stands of nettles and poison ivy; surface visibility was 20 percent or less.

Andalusia Island (Site Q)

A major beach ridge at about 548-549 feet was located along one of the major interior sloughs of the Andalusia Island. The ridge was examined because a large oak-hickory stand was present and the ridge was the highest on the island. A test excavation (Soil Pit--Site Q; Fig. 26) was made and the soil profile description and textural data are presented in Table 5 and Figure 27. The soil is reasonably well developed and is probably an Inceptisol. There is some evidence for alluviation of silts and very fine sands along ped faces. Structure is very well developed considering the location of the site. The upper 30cm appear to be recent overbank sediment which is distinctly different from the underlying sediment. It could be classified as a different parent material--a fine alluvium as opposed to the coarse alluvium in the B horizon; if so, then three parent materials exist at this site. This site represents, by far, the best example of pedogenesis observed on the pool islands. No archeological sites were located as a result of this pedestrian survey.

TABLE 5

SOIL PROFILE DESCRIPTION FOR SITE Q
ON ANDALUSIA ISLAND

A1 0-29cm.	Very dark gray (10YR 3/1) silty clay loam; moderate to strong medium granular structure; very friable (moist); no coatings or mottles; gradual smooth boundary.
B1 29-44cm.	Dark brown (10YR 3/3) loam; strong medium subangular blocky structure; friable (moist); gradual smooth boundary.
B21 44-97cm.	Yellowish brown (10YR 5/8) loam; strong medium subangular blocky structure; friable to firm (moist); dark brown (10YR 3/3) coatings, continuous on tops and sides of peds; gradual smooth boundary.
B21 40-97cm.	Yellowish brown (10YR 5/8) loam; strong medium subangular blocky structure breaking to strong fine subangular on occasion; friable to firm (moist); dark brown (10YR 3/3) continuous coatings on tops and sides of ped faces; gradual smooth boundary.
IIB22 97-122cm.	Yellow brown (10YR 5/6) sandy loam; moderate fine to medium subangular blocky structures; friable (moist); Very dark grayish brown (10YR 3/2) and dark brown to brown (7.5YR 4/4) coatings on ped faces; gradual smooth boundary, occasionally abrupt.
IIB3/C 122cm.	Dark grayish brown (10YR 4/2) sandy loam; weak to moderate fine subangular blocky structure; very friable (moist); some massive areas; dark brown (10YR 3/3) discontinuous coatings; common, fine, distinct dark gray (10YR 4/1) mottles with some few, moderate, distinct strong brown (7.5YR 5/6) mottles.

TABLE 5 (continued)

Remarks

Some large krotovina in B horizon. Upper 29cm appears to be recent overbank sedimentation at site as it is distinctly finer in texture than the rest of the profile. Earthworm activity is high in this horizon. Many very fine sand accumulations along vertical ped faces in the B21 that are pinkish white (10YR 8/2).

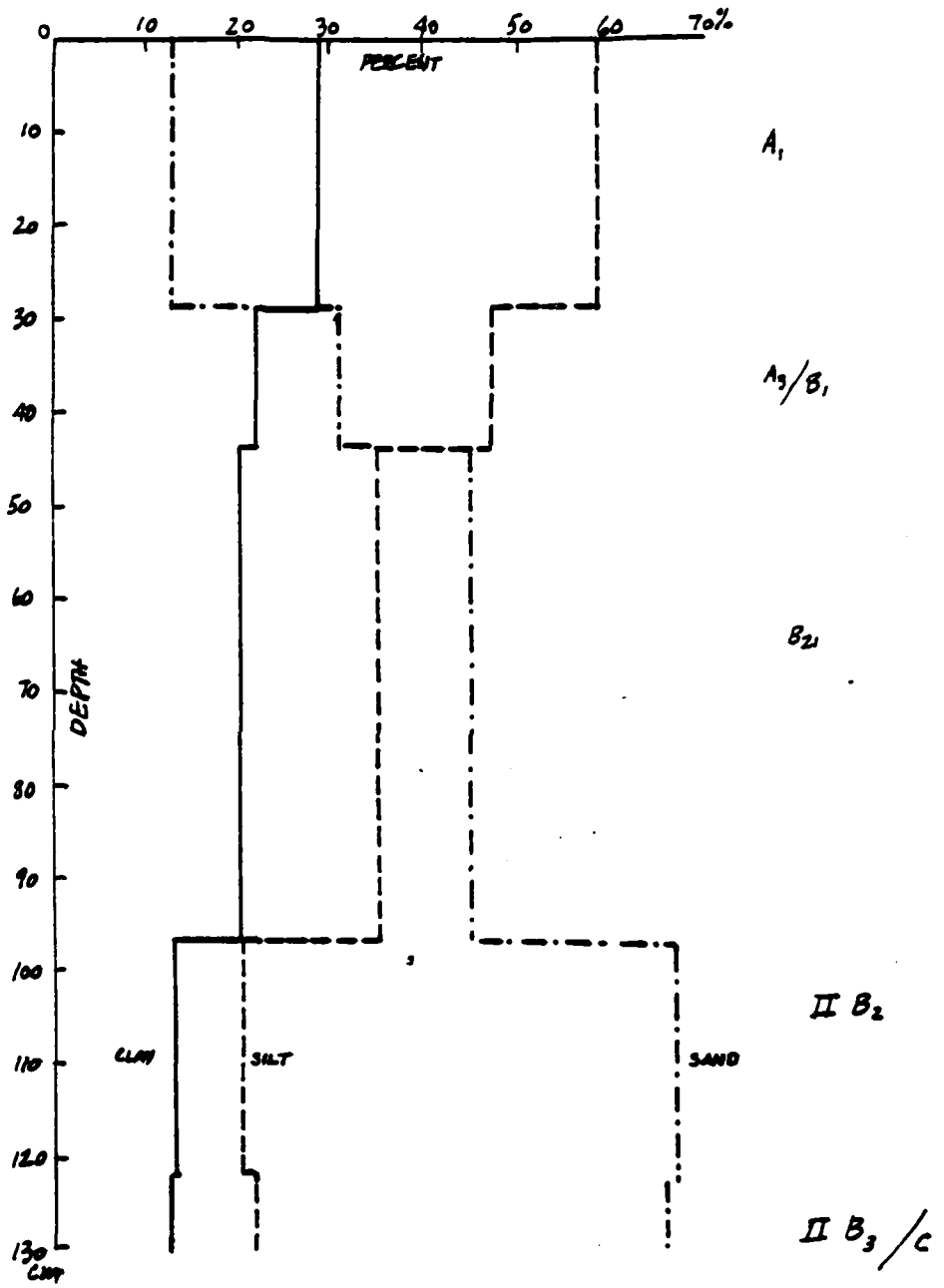


Fig. 27. Textual Data, Site Q.

ILLINOIS SHORELINE

The Illinois shoreline in Area 2 was surveyed first by boat and varied greatly from gently sloping beaches to steep banks; in some places the shore is quite rocky. Surface visibility in general was very poor, from zero to 40 percent, mainly due to dense vegetation. No sites were located by the boat survey, and four locales were selected for pedestrian survey.

The first was along the lower reaches of Coal Creek, immediately above its confluence with the Mississippi. Both sides of the creek were surveyed, but no evidence of cultural material was found. The second locale extended from the Andalusia Slough Access Area to the boat access area in the Loud Thunder Forest Preserve. Much of this area is in the Loud Thunder Forest, where dense vegetation predominates except along trails and the shoreline. A prehistoric site (11-Ri-511) was located at the Andalusia Slough Access Area at approximately river mile 469.5, and another (11-Ri-509) was found between the trail and the shoreline in the Loud Thunder Forest Preserve at approximately river mile 467.5. Cultural material from 11-Ri-509 consisted of late 19th-century historic artifacts. A Late Woodland site (11-Ri-510) also was recorded near the boat access area at the Loud Thunder Forest Preserve, not far from IAS Site 11-Ri-181 at approximately river mile 467.25. A small harbor had been dredged at the access area, and dredge spoil appears to have been dumped along the side of this harbor, burying any cultural resources that might have been present.

The third section of Area 2 surveyed on foot was along a small unnamed creek and the edge of a housing development near Site 11-Ri-189. Visibility was 15 percent or less because of dense vegetation. Prehistoric site 11-Ri-508 was discovered there along the edge of the terrace at the 550 elevation contour. The last area surveyed in Area 2 was along the Illinois shore at approximately river mile 465 in a heavily vegetated and very wet locality with surface visibility of less than 10 percent. No cultural material was found.

SUMMARY

Three archeological sites in Iowa and seven in Illinois had been previously identified in the general vicinity of Area 2. Seven were identified as Woodland and two as Archaic, with one of unknown cultural affiliation. Almost all of these sites are situated along bluff tops.

Nine previously unrecorded archeological sites were located in Area 2--five in Iowa, four in Illinois. The only one of the nine with diagnostic prehistoric artifacts was 11-Ri-510, which produced three Late Woodland sherds.

Detailed geomorphological research was more restricted in this area of the pool. However, one profile (Location Q) contributed significant data in understanding the depositional history of the pool. This profile not only was representative of the middle section of the pool, but also was an important comparative example to profiles and patterns observed in Area 1.

Survey Area 3

(Lower Quarter, approximately river mile 457 to 462; Fig. 28)

Area 3, at the southwestern end of Pool 16, contains approximately 32.5 miles of shoreline. Twenty-four miles were surveyed by boat and 0.3 square miles were surveyed on foot.

IOWA SHORELINE

The Iowa side of Pool 16 in Area 3 has been heavily modified by the construction of Highway Route 7 and the Chicago, Rock Island and Pacific Railroad. Both run parallel to the river and so close to the water that in places ballast under the road and the railroad actually forms the shoreline. Most of the shoreline in this section is heavily vegetated, making surface visibility very poor.

Two Iowa locales in Area 3 were surveyed on foot: the banks of Sweetland Creek, and the Corps property at the far southwestern end of the pool close to Lock and Dam 16. The banks along the creek where it traverses the survey area were also surveyed, but no archeological sites were located. Near Lock and Dam 15, between the Chicago, Rock Island and Pacific Railroad and the Mississippi River, surveyors spaced approximately 2m apart systematically walked over the area. Surface visibility was very poor, 10 percent or less. Site 13-Mc-75 had been previously reported in this area and we inspected this area closely despite poor surface conditions. The site was re-located and a surface collection was made; about 20m from this first scatter, a second scatter of cultural material was located. The separation of the two scatters could be a factor of varying surface visibility. Despite resurvey, the site is still of unknown cultural

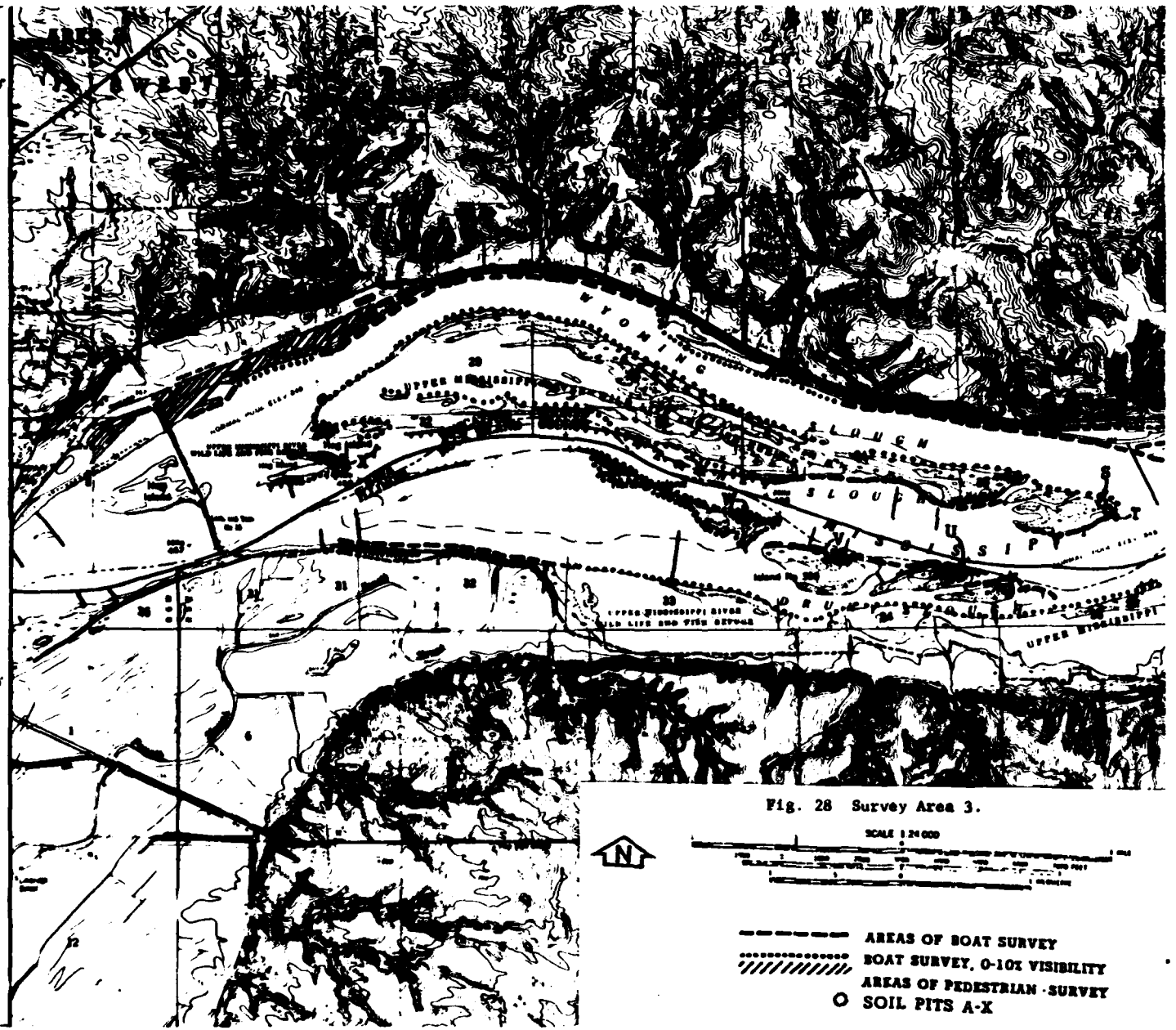


Fig. 28 Survey Area 3.

affiliation. No other sites were found on the Iowa side in Area 3.

ISLANDS

Islands in this area have been severely affected by the pool. Geneva Island, Hershey Island, and several others have been almost entirely inundated, leaving only low, long, narrow, heavily vegetated ridges protruding above normal pool. The highest ridges are only about 1m (3ft) above normal pool. As a result, these islands have undergone extensive geomorphic change since 1937, and there is little or no probability of finding surface artifacts on them. The higher ridges, which normally would be prime locations for habitation, are now subject both to inundation and to wave erosion because of the elevated pool level.

Several areas on the islands were selected for pedestrian survey and soil pit testing. Six soil pits--each 1m by 1m and approximately 1m deep to water level--were excavated; they are indicated on Figure 1 by the letters S, T, U, V, W, and X. No sites were located as a result of the pedestrian survey or the test excavations.

ILLINOIS SHORELINE

The Illinois shoreline in Area 3 is thickly vegetated and the water very shallow near the shoreline, again making survey difficult. During the boat survey, little of the shoreline was visible; pedestrian survey would have been useless because to the wet, marshy nature of the terrain. A limited section of the shoreline was walked and revealed only recent refuse from fishermen. No sites located.

SUMMARY

Previously known archeological sites in or near Area 3 are 13-Mc-75 (a small site of unknown cultural affiliation), 11-Ri-209 (a Woodland site), 11-Ri-222 (Late Woodland site), 11-Ri-70 (a Woodland mound), and 11-Ri-223 (also a Woodland mound). Only 13-Mc-75 is on Corps of Engineers property;

the others are on bluff tops or higher terraces. No detailed geomorphological research was done in this area of the pool, largely reflecting the submerged condition of the relevant terrain.

HISTORIC RESEARCH

No historic sites were located by the field survey, and the historical overview of the Pool 16 area is summarized here as a unit rather than according to the three survey areas. The historic research began with a review of various documentary and archival resources that were known to potentially contain site locational data. In Illinois, the available plat and atlas resources that contain site-specific locational data pertaining to the 19th century usually consist of post-1870 maps. However, with the aid of the USGLO plats from about 1837-1838, we were able to extend the documentary evidence for historic sites for part of the Pool 16 area back into the late 1830s. Pre-1830 surveys--commonly used by archeologists to reconstruct historic contact period vegetation communities--normally do not contain information relevant to the early 19th-century cultural landscape. By the 1830s, at the discretion of the surveyors, not only the physical but also the cultural landscape was recorded. The USGLO plats available for the Illinois side of Pool 16 did not contain site-specific locational data for any historic sites. The 1837-38 plats for the Iowa side of the pool, however, had the cultural features recorded at the time of the survey, and several sites illustrated on these plats are located in the pool area, although none was located during the survey. The analysis of these pre-survey landscapes extends our knowledge of the project area back through time approximately 35 years, a crucial 35 years in respect to the early settlement of this segment of the Midwest.

It is difficult to conduct a documentary survey of a single physiographic region such as the Mississippi River bottom of Pool 16 and obtain a holistic view of the settlement process. In order to obtain a better understanding of the early to middle 19th-century settlement and utilization of this part of the Mississippi River Valley by Euro-Americans, an analysis was conducted of the USGLO plats for an area two townships wide by five townships long, paralleling the Mississippi River Valley (Fig. 29). A similar analysis of a presurvey landscape was conducted for the middle Rock River Valley in the Erie vicinity (Mansberger and Coleman, 1982) and in southeastern Missouri (Ekberg et al. 1981). Comparison of these three presurvey landscapes illustrates many similarities and suggests locational preferences of early 19th-century settlers.

The early Euro-American settlement of Navigation Pool 16, although contemporary with that of the Rock River Valley, was not as extensive. This undoubtedly was a function of the wide floodplain along the Rock River with its well-developed terraces. Such terraces ran reduced risks of inundation by annual flooding and, together with the broad

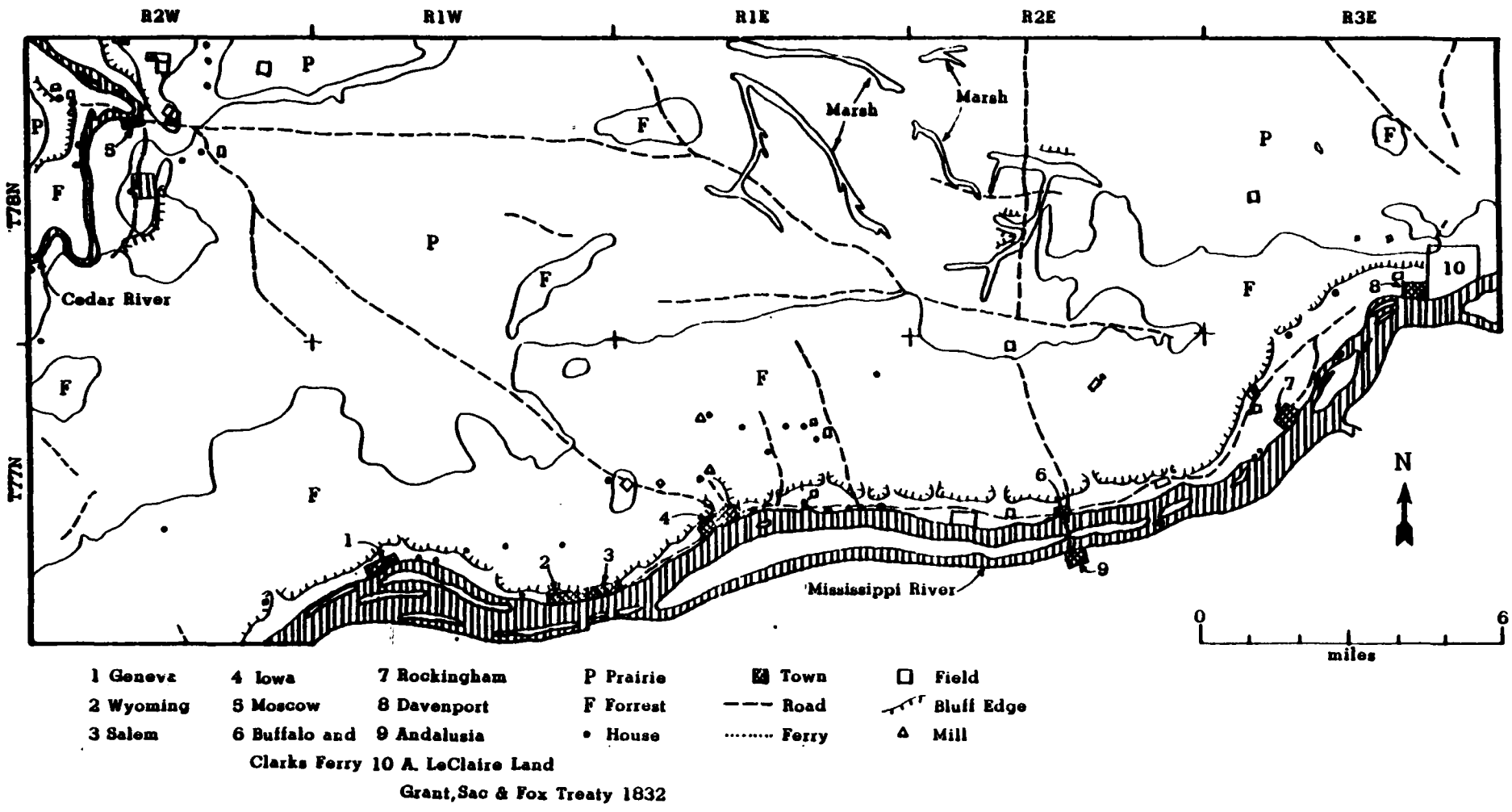


Fig. 29. Historic documentary areas. (Based on U.S. Government Land Office Plats dated 1831)

floodplains, were essential to extensive land-use practices of grazing cattle in the bottoms and the forest edge and tilling small plots of prairie soil.

A typical farm plot was situated near a prairie/timber border, either on a terrace or a bluff crest. Neither a wide floodplain nor large terraces are present in the Pool 16 area. The Mississippi River Valley along Pool 16 is young (Holocene) and does not have the wide, deeply entrenched valley typical of the Mississippi River Valley in most other locations. Areas of wide floodplain development and large terraces are located both up and downriver of the Pool 16 project area, and it is in such locations that one would expect a proliferation of early Euro-American settlers. Few sites were identified in the actual survey area, and no historic structures were located during reconnaissance. The historic pattern reconstructed from available documentary resources is summarized to aid further research and resource management.

Farmstead Locations

The positioning of early farmsteads in the project area was not random, since early settlers were constrained by several major environmental factors. First and foremost, they sought locations near a prairie/timber border. There was no avoidance of the prairie environment as the "Frontier Ideal" model of early settlement maintains (Boggess 1908; McManis 1964; Pooley 1908). On the contrary, the early settlers in the project area desired easy access to both forest (for timber and food resources) and prairie (for ease of clearing for small-scale agriculture and for grazing of cattle); thus, they settled near the prairie/timber ecotone where they could exploit both environments. Three physiographic locations initially selected were: (1) the river edge, (2) the bluff edge, and (3) the terrace edge. In the Pool 16 area, early farmsteads appear to have been regularly spaced, approximately 1/4 to 3/8 miles apart.

Proximity to a transportation network also influenced farmstead location. Even in the earliest stages of frontier development--unlike the "Frontier Ideal" model vision of it--very few early settlers were self-sufficient and independent of trade with the outside world. Two types of transportation networks were recognized in the project area: the interregional and the intraregional.

Early settlement in Illinois clustered along the major navigable river corridors. McManis (1964:23) pointed out that the prairie environs were avoided principally because of the lack of a natural, efficient transportation system. The major interregional network was the Mississippi River,

which connected the project area with market outlets in St. Louis and New Orleans.

Where the river system did not provide an efficient transportation network between regions, another type of interregional corridor developed--the interregional road network. Road networks tended to follow the timber/prairie border as closely as possible. In the project area, the major network of this kind included the river road leading to the Rockport/Davenport area and the overland roads leading to Moscow. Settlement along these interregional road networks appears to have been relatively sparse except at their terminals, at junctions with other networks, or along junctions with prairie/timber ecotones.

The intraregional road network in the Pool 16 project area consisted of several short roads connecting isolated farmsteads with their respective nearby service centers or communities. It is along the intraregional road network that the majority of the farmsteads were located.

Service Center Locations

Nine small communities were located in the project area in the first half of the 19th century. They functioned as trade, political, religious, and social centers for farmers who lived in the open countryside. All of these communities were situated along an interregional transportation network, and except for Moscow, which was located on the Red Cedar River, they lined the bank of the Mississippi River at an average interval of 4.2 miles. This corresponds remarkably well with the average distance of 3.8 miles between communities along the Rock River (Mansberger and Coleman 1982).

Brush and Bracey (1955:568) noted two hierarchic classes of 20th-century settlement clusters within the Driftless Region of Wisconsin. The lower ranked hamlets were spaced at intervals of 8 to 10 miles. The Rock River and Pool 16 communities were spaced closer together, apparently reflecting the less efficient transportational system of the mid 19th century. As Beardsley et al. (1956:151-2) noted, the key factor within agricultural societies that influences the community settlement pattern is the "degree of mobility" of that society. This is in contrast to the "productivity of the subsistence system," which is the chief limiting factor for nonagricultural societies.

The service centers in the Pool 16 area developed around necessary services such as a saw/gristmill at Montpelier, ferries at Buffalo and Andalusia, and a steamboat wharf at Drury's Landing. The communities of Andalusia and Buffalo grew up around the ferry crossing established by

Captain Benjamin Clark in 1833, the only crossing for many years along the stretch of the Mississippi River below Le Claire's Ferry near Davenport. Clark's ferry was a major crossing point for settlers entering Iowa. According to Kett (1877:235):

> This ferry became the most important one above St. Louis, attributable to the course of immigration, and its approaches being free from any marshy areas, and gradually descending to the valley shore. It is now supplied with a steam ferry boat. . . .

Clark's ferry crossing is illustrated on the USGLO plats. An early saw and planing mill was erected at Buffalo and another at the mouth of Duck Creek (Interstate 1882:974,979).

Another area within Pool 16 that flourished because of the early services it provided was at the mouth of Pine Creek, where several early saw and gristmills operated by the Nye family were located. Although Benjamin Nye platted a town (Montpelier) at this location, it never flourished. Several building foundations associated with this community are still present but are just outside the project area (Kemper, personal communication).

According to the county histories, Benjamin Nye and his cousin, Stephen, took up claims in the spring of 1834 and built cabins on opposite sides of Pine Creek. Benjamin went to St. Louis to lay in a stock of goods and then opened a store at Pine Creek. In the fall of that year he returned to Ohio and brought his family to Iowa.

In 1838 Benjamin Nye was involved in an incident with Major William Gordon; the county histories contain many versions of the events. One version (Richman 1911:210) was that Major Gordon was a West Point graduate and ex-captain of the First Regiment of United States Dragoons. After retiring from the Dragoons, he became a trapper, spending his winters near the mouth of the Pine where, in the early part of 1838, he and Arthur Washburn opened a trading post or store. This venture was not successful and Major Gordon became

> disgusted with mercantile pursuits and if possible, with all civilized life, became exceedingly irascible and did not much admire his more successful neighbor, Mr. Nye, and soon had a feud with him (Richman 1911:210).

Nye ordered Gordon from his land and hit him with a large bludgeon, knocking Gordon to the ground. Gordon fired his

derringer, but missed Nye. Gordon lay near death for several weeks.

Another version (Richman 1911:211) states that Gordon and Nye were partners in the store and that they got into a "difficulty" in which Nye stabbed Gordon with a pocket knife and sold all the goods while he was laid up. A third version relates that Major Gordon was a "noted border desperado" who became involved in a controversy with Nye and attacked him. They had a fierce fight with bowie knives and both were thought to be fatally wounded, but Nye recovered.

The 1840 census shows Benjamin Nye in Muscatine County with two young males (probably sons), three young females (probably daughters), his wife, and three males, 40 to 50 years of age, living within his household. The 1850 census states that Nye was 53 years old and working as a farmer. His wife Alzuba was 51. Also living at home were a son, Moses, who worked as a teacher, and two daughters. Moses and one of the daughters, Mary, were both 27.

Nye was killed in 1852 by his son-in-law, George McCoy, who had married Nye's daughter in 1839 or 1840. Relations between Nye and McCoy were never good. McCoy left for California in 1849 to hunt for gold, and when he returned in 1852 to retrieve his wife and children, Nye refused to let them go. McCoy took his family by force and Nye followed them. When Nye caught them, he tried to take the children back. McCoy shot at Nye twice with a revolver and missed; then Nye picked up a stake and hit McCoy's arm, making him drop his pistol. McCoy then drew his knife and stabbed Nye twice, killing him (Richman 1911:212).

Nye's wife Alzuba died on the original claim in 1879. In 1884 the plat showed the land as belonging to E. Clemons. No structure appears on any of the later plats. Although a new county road and railroad have been constructed across this site, there is no doubt that some integrity is still left of this important 19th-century trading center (Kemper, personal communication).

Except for Drury's Landing and Andalusia, all the communities along the Mississippi River were located on the Iowa side. This pattern probably reflected both the presence of large marshy islands (such as Andalusia Island) along the Illinois shore and the ease of acquiring land on the Iowa side. By the 1830s, it was difficult to obtain title to much of the Illinois Military Tract.

Coal mining was an industry associated at an early date with the Pool 16 area. Although it does not appear on the USGLO plats, a coal bed was worked as early as 1834 in Buffalo Township, and coal was hauled to the mouth of

Bowling's Creek and sold to passing steamboats (Interstate 1882:286).

Late 19th-Century Sources

Only twelve historic sites potentially located in the project area were discovered through a search of the late 19th-century plats and atlases. Six of these sites were located in Illinois, and six on the Iowa side of the river.

Illinois Sites

Near Andalusia, Illinois, both Thompson and Everts (1868) and the Iowa Publishing Company (1905) illustrate a structure located northwest of the town, close to the river. In 1868 this property was owned by Hannah Wells, and in 1905, by Peter Johnson.

About a mile further downriver, at the intersection of Sections 28 and 29, Thompson and Everts (1868) show a group of four structures very near the river's edge. No owners' names are given. In 1905 (Iowa Publishing Company 1905) the area was owned by A. Nicemanner, and a single structure was shown at this location.

In 1868 (Thompson and Everts 1868) L. Parmento owned a structure on a ridge above the river. By 1899 this had passed to H. Bremmer, and in 1905 it was owned by J. McKillup. A half-mile down the river, overlooking Andalusia Slough in 1868, was a structure labeled "W.S." This structure does not appear on any of the later plats. A structure owned by the Kremble Brothers in 1905 was also shown at the base of the bluff on land presently incorporated in the Loud Thunder Forest Preserve.

Iowa Sites

Drury's Landing was slightly upriver from Muscatine and was illustrated on the 1868 plat (Thompson and Everts 1868). The exact date of the founding of Drury's Landing is unknown, but it probably was settled during the 1830s or early 1840s. The community is illustrated in Richman (1911:232-33). Drury's warehouse is shown on the corner of the upper slough and river. A dock projecting over the water is where steamboats landed to load or discharge cargo and where the horse ferry landed. A large door on the slough side of the warehouses also was used to receive and deliver freight. The long building with the double porch

was Reynolds Drury's home, in which his store occupied a room at the corner under an awning. The lower floor behind the porch housed a large kitchen and dining room.

Dr. Eli Reynolds had an office and a small apothecary shop in the small square front building immediately south of Drury's. The next building south was Asbury Warfield's general store. The first house back of the warehouse on the slough bank was Tom Comstock's cooper shop. Next was Reynolds Drury's ice house and cold storage room. Then came Jim Town (Drury's suburb). The blacksmith shop here was run by a man named DuPont. The other small buildings along the bottom are residences. Probably six or eight houses were scattered around and back to the hill (Richman 1911:232-33).

Two sites shown on the plats and four sites mentioned in the county histories are also on the Iowa side of the river. Just west of the town of Montpelier stood a structure owned by George Robinson in 1899, but it is not shown on any of the other plats. At the mouth of Pine Creek, the 1874 plat shows a structure belonging to A. Nye. This is the same site that is illustrated on the earlier USGLO plats.

Sites mentioned in the county histories but not shown on any plats include the cabin of Stephen Nye (cousin of Benjamin Nye) located on Pine Creek and the sawmill for the town of Geneva. The community of Geneva was laid out in 1836 and had a sawmill located at the mouth of the associated creek (Richman 1911:120).

Many of the islands, such as Andalusia Island, were subdivided by the mid to late 19th century into narrow plots with river frontage and were utilized either by hunters and fishers or "river dwellers" of extremely low socioeconomic status (Northwest Publishing Company 1894; Thompson and Everts 1868). No island structures are indicated on any of the 19th-century plats within the Pool 16 area. Although these islands are little documented, there is no doubt that they were being utilized, and small farms were established on many of the larger islands. Pictures of 20th-century houses associated with these marginally successful farms are present in the Land Acquisition Files and are plotted on the original Plane Table Surveys of Pool 16, both dating from the 1930s.

During the early to mid 19th century, many sites were situated along the river's edge to take advantage of the river transportation network. By the late 19th century there is only limited documentary information pertaining to the few individuals occupying and utilizing the river's edge and islands. However, we know that the area was being used for farming and logging and as sportsmen's resorts. The

people utilizing the area in this way may be considered among the "inarticulate" of that era.

Despite the detailed locational data consulted in the Rock Island District's real estate office, none of the historic structures illustrated in the late 1930's land acquisition data was located by the field survey team. Both human and natural forces probably were responsible for the disappearance of these historic structures: some were hauled away or burned after government acquisition; some were swept away by floods; some were decimated by hunters scavenging for materials to build or repair blinds and for wood to fuel their heating and cooking fires.

Two enterprises that operated intensively in the Pool 16 area during the late 19th century were the lumbering and pearl-button industries, both of which, unfortunately, are poorly documented. The first log rafts took to the river in 1845, and during the middle 1800s large numbers of trees were cut from the floodplains and bluffs of Iowa and Illinois and shipped downriver. By the 1890s, however, the logging industry had dimished because most of the timber had been cut.

The Button Industry

From humble beginnings, the shell-button industry developed into a major economic mainstay of Muscatine, Iowa, engaging large numbers of men in clamming the mainstream and sloughs of the Mississippi River. The initiator of the freshwater pearl-button industry in Muscatine was J. F. Boepple, an immigrant German button maker. Recognizing the suitability of native mussels for button material, Boepple began collecting the mollusks and cutting buttons from them on crude equipment in 1891 (Pratt 1878; Richman 1911:303). Although not resulting in great financial rewards, Boepple's efforts heralded the advent of a vital industry in Muscatine. Realizing the profits the fledgling industry could provide, numerous speculators entered the field. In the eight years following Boepple's discovery, 14 factories (Huebinger 1899:73) employing 1500 workers appeared in Muscatine (Smith 1899:425). The industry, in smaller degree, spread to Davenport as well (Downer 1910:755).

This industrial expansion resulted in numbers of men turning to the Mississippi River for their livelihood, collecting mussels for sale to the button manufacturers. Men and boys waded into shallow water and gathered mussels by hand (Smith 1899:425). In deeper water flat-bottomed boats equipped with "crowfoot" dredges traversed productive shell beds. These dredges were constructions of pipe from which four pronged hooks connected to heavy cord were

suspended (Parmalee 1967:2). The hooks were dragged over the mussel bed by the drifting boat. A mussel coming into contact with a hook would seize it, remaining closed until hauled into the boat (Parmalee 1967:2; Richman 1911:304). Shells in the deeper beds were harvested by steam dredges capable of removing a ton of shells an hour (Smith 1899:425).

When sufficient numbers of mussels were collected, the clammers would return to camps on the shoreline to prepare their catch for sale to the manufacturers. Initially, the mussels were steamed in square, watertight, wood containers with metal bottoms. After 20 to 30 minutes of steaming, the internal organism would be dead and the shell easily opened (Parmalee 1967:2). The meat was then removed and checked by women for pearls and irregularly shaped pearl "slugs" (Clarence Schmarje, personal communication). Finally, the shells were sorted according to species. Representatives of the button factories visited the camps to purchase the shells, which were then shipped to the button works by barge.

A cottage industry developed in the Muscatine area in response to the button boom. To augment family incomes, some men cut button blanks in their spare time on crude equipment in their sheds, while women sewed buttons onto paper cards for retail sale. Such practices were ended through the interference of the federal government during the 1930s (Richard Hines, personal communication).

As early as 1899, concern was being voiced about the decreasing availability of mussels in the once prolific beds of the Mississippi (Smith 1899:425). Automatic facing and drilling machines developed by the Barry Manufacturing Company in 1901 (Coker 1919:66) increased greatly the speed with which pearl buttons could be produced, and a concomitant increase in the demand for raw materials ensued. Still, the number of factories grew. By 1911 over 4000 men, women, and children were engaged in various stages of pearl button manufacture at nearly 50 concerns in Muscatine alone (Richman 1911:304).

Pollution, siltation of breeding grounds and shell beds (induced by farming and channel damming), and overfishing of mussel beds seriously depleted commercial mussel populations in the upper Mississippi (Ellis 1931:9-10). In response to this crisis, the United States government established a clam and mussel hatchery and research facility near Fairport, Iowa, in 1910 (Richman 1911:305). Although experiments in artificial propagation of freshwater mussels were successful, depression era economic policy forced the suspension of the program in 1933 (Muscatine Journal 30 December 1938).

Artificial propagation of commercial mussel species did not continue long enough to have any considerable effect on mussel populations. Nonlocal mussel sources were heavily utilized by the flagging pearl button industry in the late 1930s (Muscatine Journal 30 December 1938). Mussel of finer quality than the Mississippi varieties was imported from the White, Black, Ohio, and Tennessee rivers (Richard Hines, personal communication; Clarence Schmarje, personal communication).

Inroads into the market by composition buttons heralded the end of the pearl button industry. The effects of the cheaply produced synthetic buttons were felt strongly during the Great Depression by the shell button manufacturers (Muscatine Journal 30 December 1938) who never regained a sure footing in the market. By 1965 all pearl button manufacturers had switched to producing synthetic buttons or had ceased production altogether (Clarence Schmarje, personal communication).

Mussel fishermen still collect mussels from the Mississippi River, employing johnboats and crowfoot dredges in the same manner as their predecessors (Parmalee 1967:2). Their catch is now bought by merchants who ship the shell to Japan, where it is cut into pellets and used to culture pearls (Parmalee 1967:4; Richard Hines, personal communication; Clarence Schmarje, personal communication).

No sites reflecting mussel procurement activities or button manufacture were discovered during the survey of the project area. It was reported that mussel fishermen gathered at what is now Andalusia Harbor, preparing their catch for sale during the 1930s and 1940s. The site was radically altered by the construction of the harbor and a nearby dike, leaving no trace of the original work area remains (Kenneth Finley, personal communication). Some mussel shells utilized for button material were discovered sporadically along the mainland shorelines, but no concentrations clearly indicating mussel preparation or button manufacturing areas were encountered.

Summary

Trewartha (1940:38) claimed that the service centers currently present within northwestern Illinois were "relatively contemporaneous with the initial settlement of the area." However, by comparing the location of late 19th-century service centers with the earlier 19th-century USGLO plats, it is clear that preferences for site locations have changed through time. There was a change in the interregional transportation network (river to railroads) which resulted in a reorganization of the cultural landscape during the late 19th century. Associated with this change

was the "filling in" of the cultural landscape and the switch from an extensive land use pattern to an intensive land use pattern.

No sites connected with either the logging or button industry were located, although special purpose sites (camps, mills, clamming stations, and the like) must have been scattered throughout the project area. This lack of sites may be attributed both to their temporary nature and to erosional, depositional, and dredging activities that have taken place since. Photos taken about 1930 of logging activities are available in the Pool 16 Land Acquisition Files.

Documentary and archival sources permitted relatively detailed reconstruction of 19th-century settlement and economic patterns in the Pool 16 area. However, the survey yielded no definite historic structures or large scatters. In some cases, this reflects 20th-century economic activities (such as the railroad and highway) that have often followed the shoreline and obliterated earlier remains. In other cases, the sites have been subjected to human and natural impacts that are indirectly, directly, and also unrelated to the construction of Lock and Dam 16, and it appears that any significant remaining historic sites are concentrated above the 550ft contour on the adjacent terraces and bluffs.

SUMMARY

Erosion and Sedimentation Patterns

MAINLAND SLOUGHS AND RIDGES

Active sedimentation and erosion patterns vary greatly within the pool, both spatially and temporally. Erosion may be followed by sedimentation at the same spot during the same flood. There are certain areas, however, where one process appears to be dominating the other and in most cases these are easily recognizable. In the vicinity of Site A, the buried shell midden dated at 5680 ± 75 yrs BP, it is obvious that extensive deposition has occurred since the midden accumulated, but there is no evidence of extensive modern deposition. It is unlikely that more than 10cm of sediment has been deposited here since closure of the dam in 1938, the majority of that probably having been deposited during the 1965 flood. Extensive earthworm activity in the A horizon has obscured the stratigraphy.

The trenched beach ridge, Site B, shows more recent sedimentation than does Site A. Stratified sand and organic layers are similar to those found elsewhere in the pool and are interpreted as the result of post-dam sedimentation. Closer to the river and five feet lower than Site A, Site B is clearly more susceptible to sedimentation than sites farther inland. Zone C is probably the pre-dam soil, making the upper 45cm post-dam. This yields a sedimentation rate of about 95cm per 100 yrs, a rate somewhat similar for sites on Island 317.

The sloughs, both active and seasonally active, are undergoing extensive sedimentation at the present time. Annual accumulations of very fine sands, silts, and clays are the norm but, because of the continuous accretion, these areas are difficult to assess in terms of total recent accumulation, simply because no major textural discontinuities are readily visible. The net effect of the dam closure and raised pool height has been to keep sloughs wetter for longer periods of time, thus providing the mechanism for more continuous deposition of silts and clays.

ISLAND SLOUGHS AND RIDGES

Sloughs that were once only seasonally wet are now generally inundated throughout the year. Only a few points on the islands exceed 550ft elevation, as compared to a majority of the sites exceeding this elevation on the main-

land area studied. As a result, a greater amount of sedimentation has occurred on the islands than on the mainland. Ridges appear to be experiencing both overbank sedimentation, as exhibited by Sites F, H, and J, and severe bank erosion by wave action, as at Sites G through K. At many of these sites 40 to 80cm of overbank sedimentation has occurred in post-dam time, while one to two meters of bank erosion was taking place.

In many places along Andalusia Island, sloughs have been totally blocked by recent sedimentation (Fig. 30) while a short distance away large trees have been totally undercut and have fallen into the river (Figs. 31-33). This variability makes it difficult to predict future changes except of the most basic form. Given a hiatus on wing dam and breakwater construction, recent trends should continue, possibly at a slower rate. Once a geomorphic equilibruim is reached, shorelines should also become more stable as small beaches will tend to protect the bank. Erosion is taking place even in areas of low-angle shoreline composed mainly of silts and clays. In these areas, conical and fringy rill marks are common with depressions 5 to 10cm deep occurring frequently.

EFFECTS OF WAVE ACTION

Barge traffic is confined to the Iowa side of the major islands down past Andalusia Island, with the Illinois side experiencing waves generated by pleasure craft only. Extensive literature exists on the effects of barge-generated waves (see Lubinski 1980, 1981, and references therein). There is evidence for wave erosion in several areas, but at least for the upper and middle islands no large beach ridge parallels the Iowa side of the islands. Because of this, the shorelines tend to be low-angle and fine-textured, conditions favoring less erosion because wave energy is distributed over longer run-ups than would be the case with abrupt 2-meter-high banks.

The Illinois side is quite a different story. Here, the length of Island 317, parts of 318 and 319, and part of Andalusia Island all have 1.5 to 2m high beach ridges paralleling the Andalusia Slough. Observations made during this study suggest that power boats moving at greater speeds and closer to shore than barges create waves with comparable erosive energy, especially since they impact on steep, less resistant sand ridges. The low cohesiveness of the sand causes it to collapse quickly and be moved out into a foreshore position where it is unavailable to protect the bank. During high-water stages, these waves play an even greater role in bank failure owing to the higher position of wave impact.

Fig. 30. Infilled slough entrance on Andalusia Island, illustrating rapid sedimentation resulting from construction of Pool 16.

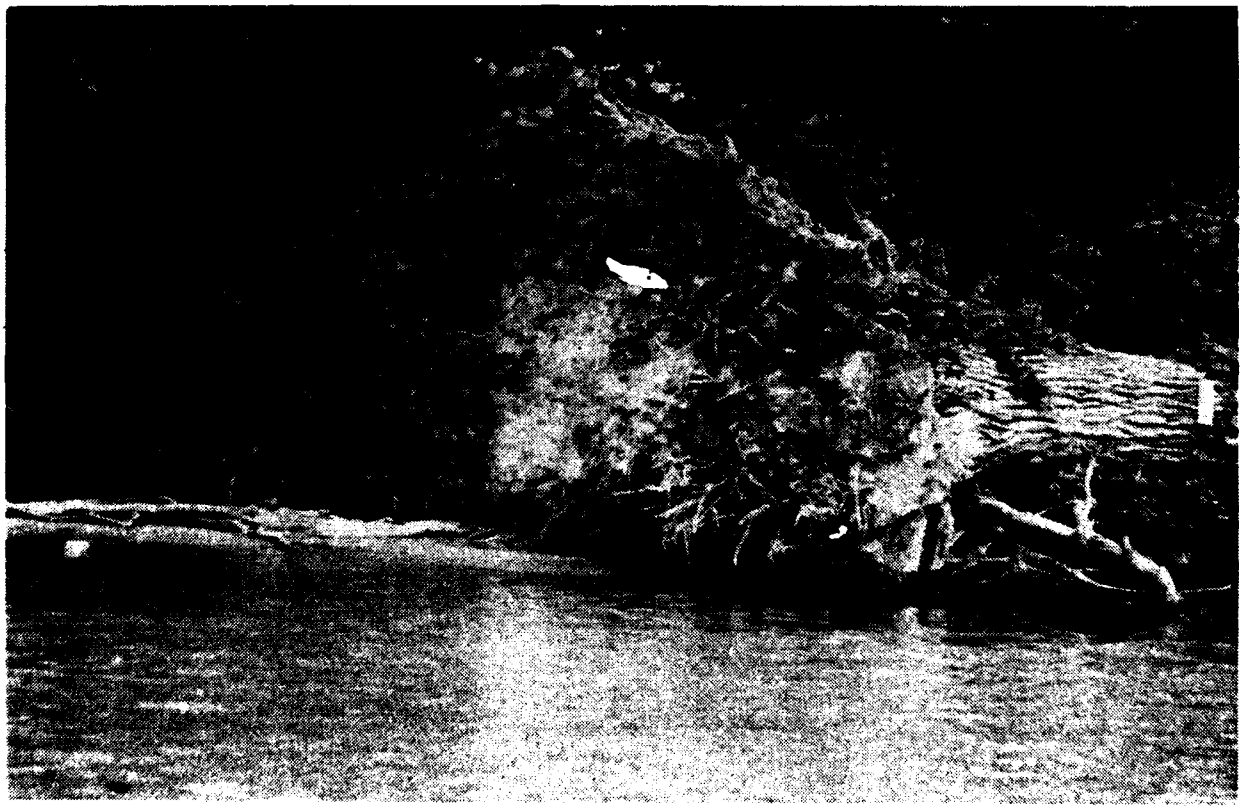


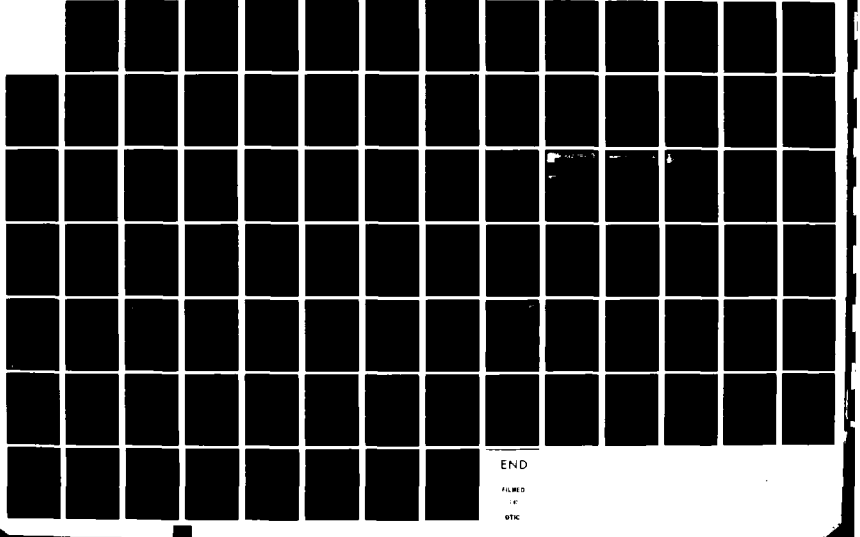
Fig. 31. Fallen tree along Andalusia Slough on Andalusia Island. Recent erosion is from wave action.

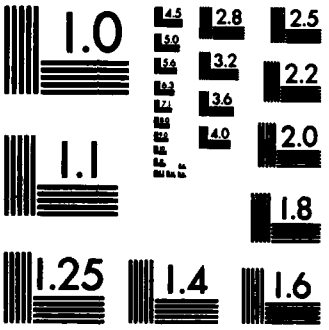
Fig. 32. Undercut bank on Andalusia Island near Fig. 31 site.

Fig. 33. Eroding bank with several fallen trees on Andalusia Island. Note extreme root exposure on trees at right of photo.

AD-A120 626 PRELIMINARY CULTURAL RESOURCE SURVEY AND GEOMORPHOLOGICAL ASSESSMENT OF S. (U) ILLINOIS STATE UNIV NORMAL MIDWESTERN ARCHEOLOGICAL RESEARCH C.. 2/2

UNCLASSIFIED M L BARNHARDT ET AL. JUN 82 F/G 5/6 NL





Another factor to consider is the timing of barge traffic relative to water level. Maximum barge traffic occurs in the fall when water levels are generally much lower than in spring. This means that the waves are affecting areas of the shore that just a few months earlier had been inundated. This may result in only readjustment and modification of shore features rather than in the creation of completely new features or the destruction of existing ones.

EFFECTS OF MAINTENANCE PROCEDURES

Principal maintenance procedures in Pool 16 consist of dredging operations to keep the shipping channel open. At no location was dredging activity found to be impacting cultural resources, nor are future projected dredge spoil locations seen as threatening known cultural resources (Bi-State Metropolitan Planning Commission 1980 a, b; 1981). To the extent that artificially raising and lowering the pool may be considered a form of maintenance, no cultural resources were determined to be threatened by these activities. The most serious erosional threat was identified in Loud Thunder Forest Preserve, where the maintenance of tourist facilities is impacting cultural resources. One might conclude that tourism/recreation poses a larger cultural resource threat than either dredging or channel erosion.

EFFECTS ON CULTURAL DATA

Since the greatest change in water level produced by construction of the dam was in the lower portions of the pool near Dam 16, the chance of finding artifacts on the surface or by shovel pits there is quite low. Overbank sedimentation coupled with severe erosion and few bank exposures reduce the likelihood of finding any substantial archeological sites by surficial inspection.

The middle islands have suffered less permanent inundation than the lower islands and, therefore, offer a greater opportunity for finding artifacts on the surface. Larger stretches of beach ridge are exposed on the middle islands, and they are less frequently inundated.

The upper islands are still higher above normal pool and, while subject to extensive sedimentation, generally offer the best chance for finding archeological sites by surface survey. It is easier to trace the modern buried soil surface across Island 317 than it is to do so across Andalusia Island because the contact is often clean sand over organic rich silt loam on the former, while on the

latter this contact may be between loam over silt loam, with extensive pedoturbation by earthworms.

CONCLUSIONS

During the survey of Mississippi River Navigation Pool 16, eleven previously unrecorded prehistoric sites, two with historic components, were identified. Eight are of unknown cultural affiliation, two are Archaic sites, and one is a Late Woodland site.

The archeological and geomorphological sites described in the text are summarized in Figure 34, together with the previously recorded sites and indications of areas surveyed. Site location information for previously recorded sites that was in the files of the Illinois Department of Conservation (Springfield) and the Iowa State Historic Preservation Office (Iowa City) is shown on a map by an "X" and the appropriate county designations and site numbers. Files of the Illinois Archaeological Survey were also checked, but they contained no locational data not available in the Department of Conservation files. Survey data are summarized by a broken line (areas where the shoreline could not be approached because of terrain problems); a solid line (areas where close visual inspection of the shoreline from the boat was possible); yellow areas (where pedestrian survey was carried out); and a symbol "." with a capital letter, indicating locations at which geomorphological data were obtained.

A total of 73 sites had been documented for the general vicinity of Pool 16 prior to the survey, 58 in Illinois and 15 in Iowa (Appendices I and II). These sites are primarily Woodland mounds--on bluff tops at the edges of the river valley--and small Archaic campsites usually on terraces in the river valley. Of the 73, only one historic and one possible Paleo-Indian site represent occupations other than Woodland or Archaic. No large habitation sites were documented or located during this survey.

The archeological sites in Pool 16 consist almost entirely of small, special-activity places that were utilized briefly. Few cultural features are present at the sites, which span the entire sequence of prehistoric and historic Indian cultures of the region--from the Middle Archaic (or possibly Early Archaic period through the Woodland pattern with perhaps some Mississippian) into the 19th century. European colonial, frontier/pioneer, and post-frontier sites dating from the 18th, 19th, and early 20th centuries also should be present. There probably are between 100 and 600 sites altogether.

Both the site distribution data and the general pattern of cultural/temporal affiliation were borne out by the survey results and background literary research. The overall impression for both the prehistoric and historic periods

is one of very minor permanent settlement in the river bottom within the confines of the Corps property, but considerably more extensive use on a short-term, seasonal basis.

As seen on the government land acquisition maps, pre-lock and dam activity was largely limited to farming, fishing, and temporary and recreational habitation. Site distribution and artifact densities suggest relatively similar patterns obtained in the prehistoric period as well, if the 13 prehistoric sites, six of them (46%) also had historic components. This suggests some comminality in site selection factors (altitude, distance from main channel or tributaries, drainage, ecotonal position, etc.) among both prehistoric and historic occupants. It also indicates some topographic stability in certain parts of the Pool 16 area.

During both periods permanent habitation was much more extensive in the adjacent Rock River Valley and in upstream and downstream sections of the Mississippi Valley, all of which had broader floodplains and a more favorable mix of exploitable niches than does Pool 16. It is clear that the full importance of sites within the Pool 16 limits can only be assessed in relationship to their location within a broader regional pattern of settlement and subsistence procurement.

Prior to 1981, archeological research along the Mississippi River had been very limited, and some recent research is as yet unreported, making comparisons difficult. However, using the preliminary reports of the Historic Sites Survey (Dudzig 1974, 1975; Gregg 1972) and our own research, some generalizations can be made. These comparisons are limited to the Illinois side of the river, since surveys comparable to the Illinois Historic Sites Surveys have not been conducted in Iowa. Over an area extending from Mercer County, Illinois, to Carroll County, Illinois, some general trends become apparent.

One Paleo-Indian site has been reported in the general area of Pool 16 (Dudzig 1974). Sites of the Archaic period have been the most frequently reported (Dudzig 1974, 1975; Gregg 1972). These sites are distributed both in the uplands along the river as well as in the floodplain proper. Many "unidentifiable" sites may also be of Archaic cultural affiliation as most are small lithic scatters with no ceramics.

Although numerous Woodland mounds have been reported along the bluff crest, few habitation sites have been documented. During the Middle and Late Woodland periods, habitation sites appear more numerous and appear to be frequently located on the floodplain (Van Dyke, Overstreet, and Theler 1980).

Mississippian sites are generally lacking along large sections of the Mississippi River (Van Dyke, Overstreet, and Theler 1980:145). On the Illinois side one site is reported in Mercer County to the south of Pool 16; none is present to the north until one reaches Carroll County, well to the north of Pool 16 and close to Pool 12.

Historic Indian sites are reported at the confluence of the Rock and Mississippi Rivers in Rock Island County near Pool 15, but urban expansion has destroyed most of these sites (Benchley and Birmingham 1976; Harrington 1933; Snodgrasse 1932; Temple 1958; Weichman 1975).

Although the Historic Sites Survey work provides a useful inventory of sites along the Mississippi River, they do not provide easily comparable results with our survey. Much of their research centered on areas such as cleared fields where survey conditions were optimal. In general, the Pool 16 area contains few such areas of cleared fields, and few areas could easily be surveyed. At present, it is difficult to determine a clear picture of prehistoric settlement patterns as many areas along the river have not yet been surveyed. Prior to surveys in Pool 16 and Pool 12, little was known of site distribution in the densely vegetated river bottom. More surveys of these types of areas will provide a better understanding of prehistoric settlement patterning and provide a more reliable basis for the development of predictive models.

The Pool 16 survey resulted in the location of several types of sites which had not previously been reported. Sites such as 11-Ri-506 and 11-Ri-507, buried Archaic shell middens, were unknown, and historic Euro-American sites were also not reported, although they were known to be present. For adequate predictive modeling and resource management, surveys should include all econiches and should report historic as well as prehistoric remains.

With the limited comparative data (D. Overstreet, personal communication) available from the Pool 12 survey at the time this report was being written, it is still clear that the importance of collaborative efforts between archeologists and geomorphologists has been validated. Such efforts might have been better structured than in the present research (see Recommendations), but the major point is that contrasts—such as the ones between broader floodplain (Pool 12) and narrower floodplain (Pool 16) lands that are almost permanently above water (Pool 12) and lands that are frequently almost entirely inundated (Pool 16), and more complex ecological settings (Pool 12) and less complex settings (Pool 16)—have isolated a series of variables that reflect the interplay between human and natural forces in the Mississippi River Valley. These variables support a

contention that detailed surveys are necessary to assess geomorphological and cultural features in river bottom areas, and that generalization will be relatively difficult. Management strategies will need to be tailored to specific areas, based on data gathered from those areas, and not cross-correlated from others.

PREDICTIVE MODEL

A major purpose of this study was to integrate the geomorphic and archeologic data acquired in the field into a qualitative predictive model of the cultural resources on federal property in Pool 16--an estimate of what kinds of resources are thought to be present and where they most probably are located. Methodologically, we feel that to be successful predictive models in the Mississippi River bottom must be based on real data from actual on-the-ground geomorphological and archeological surveys. Based on the data obtained during the research summarized in this report, our predictions about the overall distribution of cultural resources in Pool 16 are as follows.

Field evidence from Pool 16, together with published and documentary reports of prehistoric and historic sites in the area immediately surrounding the pool, indicates unequivocally that peoples have frequented the locality for several thousand years. There can be little doubt that all these peoples utilized the riverine resources for food, artifact-making materials, and fuel. Most, too, probably used the river for travel and transportation by raft and boat. But, because the pool itself occupies low ground that is subject to periodic flooding, all or most of the permanent and semipermanent habitation sites of these peoples surely were situated on higher ground--for example, the terraces and bluff crests at the margins of the river valley.

Thus, our model begins with the prediction that most or all sites in the pool are small campsites where hunters, fishermen, gatherers, and travelers stopped briefly to exploit various natural resources (e.g., mussels, fish, waterfowl, aquatic food and fiber, plants, nuts, game animals, and the like). Most such campsites probably were occupied seasonally rather than over extended periods of time.

The prehistoric cultures that may be expected to have left archeological evidence behind them begin with the Archaic and continue through the Woodland and Mississippian cultures into historic times when, it is documented, Indian, European colonials, and American frontier pioneers were in the project area. We may expect that archeological evidence of all these cultures exists within the pool.

The vast majority of archeological sites should consist of refuse left on relatively unmodified living surfaces at specialized activity sites. Most such sites, it is predicted, are small--from, say, a meter or two to 20 or 30 meters in diameter. It is unlikely that any one of these sites contains anything approaching a full range of all the

different kinds of artifacts and cultural features used by their occupants at their more permanent places of abode, such as villages or base camps. Few if any houses, subterranean storage pits, burials, or other features generally associated with permanent or semipermanent residency are to be expected. In short, we predict that the cultural resources of Pool 16 comprise only thin scatters of refuse derived from special-use, temporary campsites.

If we assume that at any given time only one geomorphic surface was available for habitation and that it was at roughly the same elevation on all islands, then the pooling effect would tend to inundate and bury the geomorphic surface at the lower end of the pool, place the surface very close to the wave action zone for the middle islands (thus making any potential site subject to both sedimentation and erosion), and leave the upper pool islands safely out of the zone of frequent erosion and sedimentation. Therefore, the portion of the pool presenting the greatest opportunity for finding artifacts on the surface would be the upper part, especially where frequent bank exposures are available for study.

Lastly, the Rock River plays an important role in the pool hydraulics and sedimentation by supplying large quantities of sediment from agricultural areas. This sediment, at least in pre-pool days, may have had a tendency to be deposited in the Andalusia Slough side of the river. This is evidenced by the small islands that appear on the 1892 maps but are eliminated by channel adjustments in post-dam time. This existing sediment is probably responsible for the deep burial of midden and beach ridge sites (A and B).

A second, and critically significant, factor is that all these camping/living surfaces have been covered over with river sediments from 10cm to more than a meter thick. Furthermore, many of them have been partially or totally destroyed by erosion. Records show that maximum levels of the frequent floods that occur at Pool 16 vary greatly. Thus, the lower the ground surface is at any particular place, the more frequently will it be inundated by flood water, and the greater is the amount of sediments that will be deposited there. Also, many low-lying landforms were created in the past few decades, and there is no possibility that they contain any undisturbed archeological materials.

It may be predicted with confidence, then, that a number of small, special-activity campsites exist in the project area and that they all are buried under layers of sediment that mask them from view, save where the sediments have been removed by erosion, excavation, or other activity. The higher the ground, the greater is the likelihood that a buried campsite is present for two reasons: (1) high ground is more attractive than low ground for camping in the river

bottom, and (2) high ground has been less subjected than low ground to both sedimentation and erosion. It is probably not entirely coincidental that of the three test pits dug on highest ground during the survey, two disclosed shell middens. One clue to high, relatively stable landforms is the presence of hardwood trees such as oak and hickory.

The geographical density of such campsites is difficult to estimate. Twelve archeological sites have been recorded within the pool, and only about 25 percent of the pool's ground surface was examined. Considering the surficial sediments and the poor visibility owing to dense vegetation, surely the twelve sites constitute only a small fraction of the total sites in the area surveyed. If we conjecture that we found 10 percent of the sites actually present, then there would be 120 sites in the 25 percent of the pool that was surveyed--and, by projection, a grand total of 480 sites for the entire pool. However, we concentrated on high potential areas during the survey, which may have made the estimate too high.

In summary, it is estimated that there are many prehistoric and historic campsites in Pool 16--at least two or three hundred and quite possibly four or five hundred. It is predicted that almost all of them are situated on the most highly elevated places on the islands and shores, where they are completely buried under sediments deposited by floods. A wide range of special activities carried out by many different cultures over thousands of years of prehistory and history--from Middle or possibly Early Archaic time up to the 20th century--probably are represented in these sites.

RECOMMENDATIONS

As noted in both the narrative portion of the report and the Predictive Model section, in Pool 16 sites may be expected to remain almost entirely at places that are highest above water level. All the sites are buried under layers of sediment that have been laid down throughout the pool. Consequently, only those sites that have been exposed by erosion or other means will be visible surficially.

Because of the pooling effect of the dam and lake, most archeological sites that may exist in the lower one-fourth of the pool are covered with especially thick sediments. There probably are sites in the lower part of the pool that are permanently inundated and thus inaccessible. Sites in the middle half of the pool are less deeply buried, but are subject to relatively intense erosion.

Sites in the upper one-fourth of the pool tend to be buried by relatively thin deposits and therefore are more accessible than those in the lower reaches of the pool.

These circumstances suggest two major recommendations regarding cultural resource management at Pool 16:

1. A cultural resource inventory can best be achieved by probing beneath the surficial sediments on the highest places on the islands and mainland shores. This might be done most efficiently by using soil corers that pull a two- or three-inch core, small mechanical ditchers where possible, and by shovel.

2. Future wave and flood erosion should be closely monitored at locations with high potential for having archeological sites present. High potential locations include not only elevated spots, but also places where historical documents indicate that people lived or worked.

At the level of more general recommendations for future studies of this type, we would propose that:

1. detailed geomorphological studies of the broader river valley prior to initiation of localized archeological and geomorphological survey would greatly assist in analyzing local phenomena found within the limited area of the river bottom; and

2. research design be structured to fully accommodate the tripartite division of the pool and the pooling and tailwater effects of the dams.

BIBLIOGRAPHY

Acme Publishing Company
1889 Portrait and Biographical Album of Muscatine County, Iowa. Chicago.

Anderson, Richard C.
1968 Drainage Evolution in the Rock Island Area, Western Illinois and Eastern Iowa. In The Quaternary of Illinois, edited by Robert E. Bergstrom, pp. 11-18.

1980 Geology for Planning in Rock Island County, Illinois. Illinois State Geological Survey, Circular 510.

Bateman, Newton (ed.)
1914 History of Rock Island County, Volumes 1 and 2. Chicago.

Beardsley, R., B. Meggers, P. Holder, A. Krieger, J. Rinaldo and P. Kutche
1956 Functional and Evolutionary Implications of Community Patterning. Society for American Archaeology, Memoir #11.

Benchley, Elizabeth and Robert Birmingham
1976 Final Report on an Archaeological Survey of Two Transmission Line Corridors in Rock Island County, Illinois. Archaeological Research Laboratories, Department of Anthropology, University of Wisconsin - Milwaukee.

Birmingham, Robert
1975 An Archaeological Survey of the Rock River Valley in Illinois. Preliminary Report of 1974 Historic Sites Survey, Archaeological Reconnaissance of Selected Areas in the State of Illinois, Part I, Summary, Section A, pp. 72-78.

Bi-State Metropolitan Planning Commission
1980a Quad Cities Urban Study, Aerial Photo Mosaics and Overlays; USACE-Rock Island District.

1980b Quad Cities Urban Study, Report text; USACE-Rock Island District.

1981 Quad Cities Urban Study, Supplement: USACE-Rock Island District.

Bluhm, Elaine A.
1961 Preliminary Report on the Archaeological Survey of the Rock River Valley. Unpublished manuscript on file at the University of Wisconsin-Milwaukee Archaeological Laboratory.

Boggess, Arthur
1908 The Settlement of Illinois, 1778-1830. Chicago.

Brush, John and Howard Bracey
1955 Rural Service Centers in Southwestern Wisconsin and Southern England. Geographical Review, Vol. 45.

Chapman Brothers
1885 Portrait and Biographical Album of Rock Island County. Biographical Publishing Company. Chicago.

Coker, Robert E.
1919 Fresh Water Mussels and Mussel Industries of the United States. Bulletin of the Bureau of Fisheries, Vol. XXXVI 1917-1918, Document no. 865. Government Printing Office, Washington.

Downer, Harry E.
1910 History of Davenport and Scott County, Iowa. Vol. 1. S. J. Clarke, Chicago.

Dudzik, Mark J.
1974 An Archaeological Survey of the Illinois Side of the Mississippi River Valley from the Mouth of the Des Moines River to the Wisconsin Border. Preliminary Report of the 1974 Historic Sites Survey Archaeological Reconnaissance of Selected Areas in the State of Illinois, Part II, Summary Section B. Conducted under the auspices of the United States National Park Services, Illinois Department of Conservation and the Illinois Archaeological Survey.

1975 An Archaeological Survey of the Illinois Side of the Mississippi River Valley from the Mouth of the Des Moines River to the Wisconsin Border. Preliminary Report of 1975 Historic Site Survey Archaeological Reconnaissance of Selected Areas in the State of Illinois, Part II, Summary Section B. Conducted under the auspices of the United States National Park Services, Illinois Department of Conservation, and the Illinois Archaeological Survey.

Ekberg, Carl, Charles Smith, William Walters, Jr. and Frederick Lange
1980 A Cultural, Geographical and Historical Study of the Pine Ford Lake Project Area, Washington, Jefferson, Franklin, and St. Francois Counties, Missouri. Illinois State University, Normal.

Ellis, M. M.
1931 Some Factors Affecting the Replacement of the Commercial Fresh-Water Mussels. U. S. Department of Commerce, Bureau of Fisheries Circular No. 7.

Finley, Kenneth
1981 Personal Communication.

Gass, J. Rev.
1881 Report of Explorations of Mounds in Rock Island County, Illinois, in 1879 and 1880. Proceedings of the Davenport Academy of Natural Sciences 3:135-139.

Gregg, Michael L.
1972 An Archaeological Survey of the Illinois Side of the Mississippi River Valley from the Mouth of the Des Moines River to the Wisconsin Border. Preliminary Report of 1972 Historic Sites Survey Archaeological Reconnaissance of Selected Areas in the State of Illinois, Part I, Summary Section B. Conducted under the auspices of the United States National Park Services, Illinois Department of Conservation, and the Illinois Archaeological Survey.

Harrington, J. C.
1933 Rock Island County Survey, General Report. University of Chicago, Department of Anthropology.

Harrison and Warner
1874 Atlas of Muscatine County, Iowa. Clinton, Iowa.

Hines, Richard
1981 Personal Communication, Muscatine, Iowa.

Horberg, C. Leland
1950 Bedrock Topography of Illinois. Illinois State Geological Survey Bulletin 73.

Hotopp, John and Michael Fokken
1977 Bridge Replacement - Muscatine County. Office of Iowa State Archaeologist. A report to the Iowa Department of Transportation Highway Division.

Huebinger Publishing Company
1894 Atlas of Scott County, Iowa. Davenport, Iowa.

Huebinger Surveying and Map Publishing Company
1899 Atlas of Muscatine County, Iowa. Davenport, Iowa.

Inter-State Publishing Company
1882 History of Scott County, Iowa. Chicago.

Iowa Publishing Company
1905 Atlas of Rock Island County, Illinois. Davenport.

Kemper, Edgar
1981 Personal Communication, Muscatine County, Iowa.

Kett, H. F. and Company
1877 The Past and Present of Rock Island County, Illinois. Chicago.

LaMarche, Valmore C., Jr.
1961 Rate of Slope Erosion in the White Mountains, California. Geological Society of America Bulletin 72:1579.

1963 Origin and Geologic Significance of Buttress Roots Bristlecone Pines, White Mountains, California. Geological Survey Research 1963: U. S. Geological Survey Professional Paper 475-C, pp. C149-C150.

1968 Rates of Slope Degradation as Determined from Botanical Evidence. White Mountains, California. U. S. Geological Survey Professional Paper 352-I: 341-377.

Leopold, Luna B., M. Gordon Wolman, and John P. Miller
1964 Fluvial Processes in Geomorphology. W. H. Freeman and Company, San Francisco.

Lubinski, Kenneth S., et al.
1980 Identification and Prioritization on Study Needs Related to the Physical, Chemical and Biological Imparts of Navigation on the Upper Mississippi River System: Contract Report 259. Submitted to Environmental Work Team Master Plan Task Force, Upper Mississippi River Basin Commission.

Lubinski, Kenneth S. and Henry H. Seagle, Jr.
1981 Information Summary of the Physical, Chemical and Biological Effects of Navigation: Contract Report 261. Submitted to the Environmental Work Team, Master Plan Task Force, Upper Mississippi River Basin Commission.

Mansberger, Floyd and Roger Coleman
1982 Literature Search and Analysis for Cultural Resources in Areas 1 through 5 of the Rock River, Illinois. Midwestern Archeological Research Center, Illinois State University, Normal.

McKusick, Marshall
1970 The Davenport Conspiracy. State Archaeologist Report No. 1. University of Iowa Press, Iowa City.

McManis, Douglas
1964 The Internal Evaluation and Utilization of the Illinois Prairies, 1815-1840. Department of Geography Research Paper No. 94, University of Chicago.

Muscatine Journal
1938 Manufacturers Join in Promotional Drive. 30 December. Muscatine, Iowa.

1938 Retrenchment Policy Conducted Artificial Propagation of Mussel Shells at U. S. Biological Station. 30 December. Muscatine, Iowa.

Northwest Publishing Company
1894 Plat Book of Rock Island County, Illinois. Philadelphia.

Overstreet, D.
1981 Personal Communication.

Parker, Jessie M.
1942 Scott County History. W. P. A., State of Iowa. Iowa Writers Program.

Parmalee, Paul W.
1967 The Fresh Water Mussels of Illinois. Popular Science Series, Vol. VIII, Springfield, Illinois.

Peterson, Robert W. (Compiler)
1978 Cultural Resources of the Upper Mississippi Valley Guttenberg, Iowa to Saverton, Missouri. Iowa State Historical Department, Iowa City.

Pewe, Troy L.
1944 Deposition of Sediments in Pool No. 15, at Rock Island, Illinois. Journal of Sedimentary Petrology, Vol. 14(3):115-124.

Phillippe, Joseph and Denise Hodge
1981 A Cultural Resource Survey of Selected Portions of the Shelbyville Reservoir Shoreline. Prepared for Department of Army, Corps of Engineers, St. Louis District by Department of Sociology, Anthropology and Social Work, Illinois State University, Normal.

Piskin, Kemal and Robert E. Bergstrom
1975 Glacial Drifts in Illinois: Thickness and Character. Illinois State Geological Survey Circular 490, p. 35.

Pooley, William
1908 The Settlement of Illinois from 1830 to 1850. Madison.

Pratt, W. H.
1878 The Shell-Beds of the Vicinity of Davenport. Proceedings of the Davenport Academy of Natural Sciences, 2.

Reineck, H. E. and I. B. Singh
1980 Depositional Sedimentary Environments. Springes-Verlag. Berlin.

Richman, Irving
1911 History of Muscatine County, Iowa. S. J. Clarke, Chicago.

Roetzal, Kathleen A.
1980 An Archaeological Reconnaissance Survey of Eilpeck Island Louisa County, Iowa. Report prepared by Impact Services Incorporated for Iowa-Illinois Gas and Electric Company Davenport, Iowa.

Schmarje, Clarence
1981 Personal Communication, Muscatine, Iowa.

Smith, Guy D.
1942 Illinois Loess--Variations in its Properties and Distribution, a Pedologic Interpretation. University of Illinois Agricultural Exploration Station Bulletin 490:139-184.

Smith, Hugh M.
1899 The Mussel Fishery and Pearl Button Industry. U. S. Commission of Fish and Fisheries, Government Printing Office, Washington.

Snodgrasse, Jessie
1932 Report of Reconnaissance Survey - Summer 1932 Lower Rock River. Department of Anthropology University of Chicago. On file at Illinois State Museum, Springfield.

Starr, Frederick
1895 Summary of the Archaeology of Iowa. Davenport, Iowa.

Temple, Wayne C.
1958 Indian Villages of the Illinois Country: Historic Tribes. Illinois State Museum Scientific Papers, Part 2, Vol. 2.

Thompson, Dean M. and E. Arthur Bettis, III
1980 Archeology and Holocene Landscape Evolution in the Missouri Drainage of Iowa. Journal of the Iowa Archeological Society, Vol. 27, pp. 1-?.

Thompson and Everts
1868 Combined Map of Scott County, Iowa, and Rock Island County, Illinois. Geneva, Illinois.

Trewartha, Glenn
1940 A Second Epoch of Destructive Occupance in the Driftless Hill Land. Annals of the American Association of Geographers, Vol. 30.

Unigraphic Incorporated
1975 Combined Atlases of Scott County, Iowa, 1882, 1894, 1905, 1919. Evansville, Indiana.

U. S. Army Corps of Engineers
1966 Master Plan for Resource Management, Upper Mississippi River, Forest Inventory Map, Pool 16.

1981 Stream Gauge Data for Illinois and Mississippi Canal, Lock 32, 1896-1972; Sunset Marina, Rock Island, 1974-1980.

U. S. Department of Agriculture
1937 1951, 1956, 1970, 1975 Aerial Photography: Scales about 1:15, 840 and 1:20, 000.

1977 Soil Survey of Rock Island County, Illinois: USDA-SCS, University of Illinois Agricultural Exploration Station.

U. S. Government Land Office Survey Plats
1837

University of Illinois
1971 Loess Soils of Northwest Illinois; University Of Illinois Agricultural Exploration Station Bulletin 739.

Van Dyke, Allen P.
1981 Archaeological Recovery at 11-Ri-217, Milan, Illinois. Great Lakes Archaeological Research Center Inc. Reports of Investigation No. 95, Waukesha, Wisconsin.

Van Dyke, Allen P. and Gordon R. Peters
1977 An Intensive Archaeological Survey, Milan-Big Island Phase II Study, Rock River, Illinois. Great Lakes Archaeological Research Center Report of Investigation No. 27.

Van Dyke, Allen P. and D. F. Overstreet
1979 Archaeological Recovery at 11-RI-337, An Early Middle Woodland Shell Midden in East Moline, Illinois. Great Lakes Archaeological Research Center, Reports of Investigation No. 60, Waukesha, Wisconsin.

Van Dyke, Allen P. and David F. Overstreet and James L. Theler
1980 Archaeological Recovery at 11-Ri-337, on Early Middle Woodland Shell Midden in East Moline, Illinois. In The Wisconsin Archeologist, Vol. 61, No. 2, New Series.

Weichman, Michael S.
1975 The Milan-Big Island, Illinois Flood Control Project: An Assessment and Inventory of Archaeological, Historical, Architectural Resources. Environmental Research Center, Report No. 17, Iowa City, Iowa.

Western Historical Company
1879 The History of Muscatine County, Iowa. Chicago.

William, H. B., H. D. Glass and John C. Frye
1956 Pleistocene Deposits Along the Mississippi Valley in Central-Western Illinois. Illinois State Geological Survey Report of Investigations 192.

1963 Mineralogy of Glacial Tills and Their Weathering Profiles in Illinois. Part 1, Glacial Tills. Illinois State Geological Survey Circular 347.

Willman, H. B. and Richard Anderson
1956 Bedrock Topography and Pleistocene Glacial Lobes in Central United States. Journal of Geology, 64(2):101-116.

Willman, H. B., et al.
1968 Bibliography and Index of Illinois Geology Through 1965. Illinois State Geological Survey Bulletin 92.

Willman, H. B. and John C. Frye
1970 Pleistocene Stratigraphy of Illinois. Illinois State Geological Survey Bulletin 94.

Windrum, B.
1980 Ghosts Along the River. Quad-City Times, 11 August.

APPENDICES

APPENDIX I
SITES NEAR POOL 16 --ILLINOIS

Site #	Site Type	Cultural Affiliation
11-Ri-7	Mound group	Woodland
11-Ri-8	Mound group	Woodland
11-Ri-10	Mound group	Woodland
11-Ri-19	Habitation	Woodland
11-Ri-23	Habitation and Mounds	Paleo to Late Woodland
11-Ri-24	Camp and Mounds	Woodland
11-Ri-25	Camp and Mounds	Woodland/Paleo?
11-Ri-27	Cemetery	Unknown
11-Ri-29	Village	Woodland
11-Ri-32	Camp	Unknown
11-Ri-33	Mounds and Cemetery	Woodland/Historic?
11-Ri-34	Corn hills	Woodland
*11-Ri-55	Mound group	Woodland
11-Ri-63	Mound group	Woodland
11-Ri-64	Mound	Unknown
11-Ri-65	Mound group	Unknown
11-Ri-66	Mound group	Unknown
11-Ri-67	Mound	Woodland
11-Ri-68	Mound group	Woodland
11-Ri-69	Habitation	Woodland
11-Ri-70	Mound	Woodland
11-Ri-72	Mound group	Unknown
11-Ri-73	Mound group	Unknown
11-Ri-74	Mound group	Woodland
11-Ri-76	Habitation	Historic
11-Ri-77	Village	Unknown
11-Ri-78	Village	Unknown
11-Ri-79	Village	Unknown
11-Ri-88	Unknown	Unknown
11-Ri-108	Unknown	Unknown
11-Ri-123	Habitation	Archaic
11-Ri-134	Unknown	Unknown
11-Ri-149	Habitation	Archaic
11-Ri-150	Habitation	Archaic
11-Ri-151	Habitation	Archaic
11-Ri-152	Habitation	Archaic

*Locational data not available.

APPENDIX I (continued)

Site #	Site Type	Cultural Affiliation
11-Ri-153	Unknown	Archaic
11-Ri-154	Habitation	Archaic
11-Ri-155	Habitation	Archaic
11-Ri-157	Habitation	Archaic
11-Ri-158	Habitation	Unknown
11-Ri-159	Habitation	Archaic
11-Ri-177	Habitation	Archaic/Middle Woodland
11-Ri-180	Habitation	Archaic
11-Ri-181	Habitation	Archaic/Historic
11-Ri-203	Non-Permanent	Archaic
11-Ri-206	Habitation	Paleo?
11-Ri-207	Habitation	Woodland
11-Ri-209	Non-Permanent	Woodland
11-Ri-210	Habitation	Late Woodland
11-Ri-212	Habitation	Archaic
11-Ri-218	Habitation	Unknown
11-Ri-219	Habitation	Unknown
11-Ri-222	Habitation	Late Woodland
11-Ri-223	Mound	Woodland
11-Ri-249	Mound	Woodland
11-Ri-257	Habitation	Unknown
11-Ri-258	Habitation/Cemetery	Historic
11-Ri-315	Habitation	Archaic
11-Ri-316	Habitation	Unknown
11-Ri-342	Unknown	Unknown
11-Ri-399	Habitation	Unknown
11-Ri-400	Occupation	Unknown

APPENDIX II
SITES NEAR POOL 16--IOWA

Site #	Site Type	Cultural Affiliation
13-Mc-4	Mound group	Unknown (Woodland)
13-Mc-6	Chipping Station	Unknown
13-Mc-7	Chipping Station	Unknown
13-Mc-8	Camp	Unknown
13-Mc-11	Habitation	Archaic-Early Woodland
13-Mc-44	Mound group	Woodland (now destroyed)
13-Mc-45	Cemetery	Early Historic
13-Mc-46	Habitation	Archaic
13-Mc-49	Secondary Flaking Site (camp)	Unknown
13-Mc-74	Occupation	Unknown
13-Mc-75	Occupation	Unknown/Historic
13-Mc-47	Habitation	Unknown
13-St-26	Habitation	Unknown
13-St-27	Habitation	Unknown
13-St-28	Habitation	Unknown
13-St-29	Habitation	Unknown

APPENDIX III

BIVALVE MOLLUSC REMAINS FROM A PREHISTORIC SHELL MIDDEN IN THE MISSISSIPPI RIVER BOTTOMS NEAR ROCK ISLAND, ILLINOIS

Stan Riggle, Chief

State Archaeological Survey
Division of Historic Preservation
Iowa City, Iowa

Bivalve shell remains were collected 19 August 1981 from a discard pile which originated from a prehistoric midden deposit located by archeologists on an island of the Mississippi River in Pool 16 of the Upper Mississippi River Navigation System. The discard pile resulted from project archeologists sorting out what valves they wished to submit for radiocarbon dating purposes. The specimens were collected by the author, the project principal investigator, and the project geomorphologist. Collection was made to ensure identification and recording of the shell remains.

The shell remains were collected from the area disturbed by the previous archeological test pit. Numerous unidentifiable fragments were left. The shells were transported by the author to the author's laboratory facilities where the shells were washed by hand over a 1/4-inch mesh screen. Precautions were not taken to collect archeological material smaller than 1/4-inch in size. Two land snails were observed during the washing of the soil matrix from the shells. These could not be identified before their disappearance, but note is made of them here to alert future investigators to the likely presence of other terrestrial gastropods in the site.

Previous exploration of the shell midden by archeologists did not include observations concerning a depositional pattern of the shells in the midden, e.g., articulated valves, imbrication, nested valves, piles of like species or valves, etc. Nested valves of different individuals of some of the species present did occur at least with Ligumia recta latissima. Two left valves of the latter (two individuals) were noted during washing of the sediments from the shells during laboratory processing. Given the friable nature of the sediments surrounding the shells and the likelihood that such sediments could easily be separated from the shells as the latter were lifted from the matrix, it is possible that the nested valves are an artifact of creation of the discard pile rather than a representation of preexcavation conditions.

TABLE 6. BIVALVE DATA FOR ARCHEOLOGICAL SITE 11-RI-506

Species	left	right	cf left	cf right	total individ.	% of ident. individ. (n=74)
Tritigonia verrucosa	1	1	-	-	2	2.7
Quadrula quadrula	1	-	-	-	1	1.4
Q. metanevra	16	20	1	2	17	23.0
Q. pustulosa	3	1	-	-	3	4.1
Amblema plicata	3	2	-	-	5	6.8
Fusconaia ebena	1	1	6	2	7	9.5
F. flava	-	2	-	-	2	2.7
Cyclonaias tuberculata	5	2	1	-	6	8.1
Elliptio dilatata	-	-	1	-	1	1.4
Obovaria olivaria	13	10	12	11	25	33.8
Ligumia recta latissima	3	4	-	4	4	5.4
Lampsilis sp.	1	-	-	-	1	1.4
Total ident. valves	47	43	21	19	74	100 %
Unident. individuals	2	8	-	-	8	
Total Specimens	49	51	21	19	82	

Following cleaning and drying, the shells were identified. Taxonomy follows Buchanan (1980) with the exception of L. recta (Lamarck 1819) to which the nominal taxon latissima has been added following LaRocque (1967). The identifying characteristics of the species follows Buchanan (1980) with consultation of LaRocque (1967) for supplemental information. Valves were also compared with reference specimens held by the author.

Numerous valves could be assigned with confidnece only to the level of genus. Provisional species taxons (cf) were then assigned where prudent. The latter procedure was used when pieces of shell exhibiting only the pseudo-cardinal teeth, cardinal teeth, the interdentum, a variable portion of the lateral teeth, or a combination of all or part of these features precluded a species taxon being assigned with confidence. In all such cases, the outer prismatic layer was absent; thus, external shell characteristics were not present.

The results of the identification process are displayed in Table 1. The predominant species in the assemblage, in decreasing order of relative abundance, are Obovaria olivaria (34%), Quadrula metanevra (23%), and Fusconaia ebena (9.6%). The area of the shell midden represented by the sample is minor in proportion to the probable size of the midden (approx. 100m , 15m). If the midden represents a relatively short-term use of local mussel beds, then variation in the relative abundance of species in different parts of the midden may reflect such an exploitive strategy.

It is very likely that the midden represents a rather specialized site where activities were limited to the processing of shellfish and other, albeit apparently more limited, aquatic resources (e.g., fish which are only inferred to be present).

Further study emphasizing the age of the site and the recovery of other ecofacts (particularly land snails) would be enlightening with regard to local riverine-oriented exploitation of food resources. The excellent preservation of the calcareous remains of invertebrates provides this site with an inherently high potential to yield significant information about past cultures in the area.

REFERENCES CITED

Buchanan, Alan C.
1980 Mussels (Naiades) of the Meramec River Basin. Missouri Department of Conservation, Aquatic Series No. 17, Jefferson City.

LaRocque, Aurele
1967 Pleistocene Mollusca of Ohio. State of Ohio, Division of Geological Survey, Bulletin 62 (Part 2):113-356, Columbus.

APPENDIX IV

DETAILS OF RADIO CARBON DATA

Sample No. MB-50 Lab. No. D-867
Request No. 16846 County Rock Island
ISGS No. 829

ILLINOIS STATE GEOLOGICAL SURVEY

Urbana, IL 61801

REQUEST FOR RADIOCARBON AGE DETERMINATION

(Use separate sheet for each sample and TYPE or PRINT.)

Date June 26 1981

Name of section or site Mussel Beach

Your sample no. MB-50 Weight of sample (dry) 1500 gms

Material to be analyzed mussel shells

Material from which sample was taken buried beach ridge-sandy loam, loamy sand

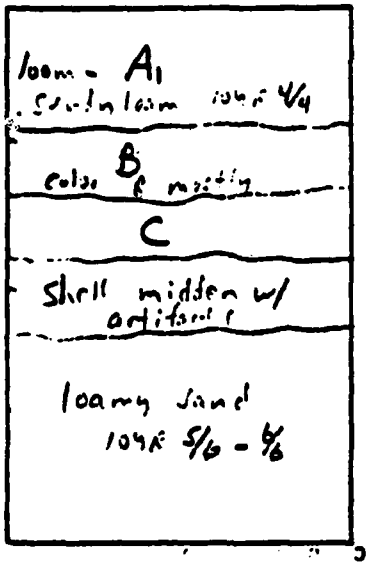
Location: County Rock Island State Illinois

SW ¼ SW ¼ NW ¼ Section 17 Township 77N Range 3E

Direction and distance (km) from town about 7 km southwest of Rock Island

41 ° 28 ' 4 " (N) S Lat. 90 ° 38 ' 27 " E (W) Long.

Stratigraphic unit, position, and thickness, or relationship with cultural materials (make sketch; use metric units)



Soil is moderately well developed. Parent material consists of overbank alluvium and backwater slough materials. Some mixing occurs due to intensive earthworm activity.

Shells represent a midden site of early Indians in this area. Shells are located on top of former beach ridge. Some artifacts are associated with deposit.

Collected by M.L. Barnhardt and P.F. Person Date collected June 5 1981

Name and address of person requesting analysis Dr. Michael L. Barnhardt
Geography-Geology Department Illinois State University, Normal, IL 61761

Title of project Investigation of Beach Ridge Development, Rock Island, IL

Significance of sample sample is from contact between overlying silty materials with some soil development and lower sandy zone representing the surface of a former beach ridge. Sample will date the rate of sediment accumulation as well as give a base time for soil development in this area. Will also help to date artifacts associated with site.

(over)

Your sample no. MB-50 Lab. no.* 0-867

Request no.* 16246 County Rock Island

ISGS no.* 829

References to relevant publications on geology of the area none specific to project. Some archeological data and general geomorphic data

Foreign matter or geologic factors that may contribute to anomalous age (e.g., root penetration, leaching, prolonged exposure to atmosphere) some root penetration seasonally wet; leached with carbonate-rich water; moderate soil reaction with acid

Sampling technique and post-sampling treatment sample taken from soil pit. More complete and intact shells were collected. Minimal cleaning of soil adhering to shells. Air-dried and then overdried at 50C

Is more of this sample available if needed? Yes

Expected age 1500 Possible age range from 1000 to 3000

Previously determined dates from same or adjacent horizons none

(The remainder of this form is for ISGS use only.)

Authorization for analysis Leon R. Follmer
Chairman, Isotopic Analysis Committee

Date July 16 1981

RESULTS OF ANALYSIS

Age (ISGS-829) 5680 ± 75 B.P. radiocarbon years

Remarks Surface leached by 2N HCL, X-ray diffraction check showed no calcite alteration

$\delta^{13}C_{PDB} = -8.8‰$

Analyst Chen-li Jack Lee

Date July 22 1981 Francis J. Kollmorgen
Section of Analytical Chemistry

NOTE: All carbon-14 age determinations will be submitted for publication in "Radiocarbon," published by the "American Journal of Science."

*These numbers will be assigned by the Analytical Chemistry Section, Illinois State Geological Survey.

RADIOCARBON DATE COMMENT FORM

ISGS-829 . Mussel Beach, MB-50 5680± 75 BP*

$\delta^{13}C$ = -8.8 ‰ PDB

Mussel shellfrom Rock Island Co, 7km SW of Rock Island, Illinois (41°28'04" N, 90°38'27" W). From top of buried sandy loam beach ridge, in association with Indian artifacts. Coll 1981 by M L Barnhardt and P F Person; subm by M L Barrhardt. Comment (MLB): These mussel shells are found at the contact between an underlying beach sand and sediments deposited during various slough and backwater periods. With ISGS-842, it helps establish the rate of deposition in area.

References cited:

This is a "conventional" radiocarbon date and refers to Radiocarbon Years before the reference year A.D. 1950. The date has been corrected for isotopic fractionation ($\delta^{13}C$), but has not been corrected for the error in the half-life of ^{14}C, or the variations in the atmospheric ^{14}C concentration. For this reason, the age in Radiocarbon Years may not be exactly equal to the age in Solar Years, or Calendar Years. Because use of the B.C. - A.D. time scale implies that the date is in terms of Calendar Years, it is urged that the date not be converted to the B.C. - A.D. time scale unless the above mentioned corrections have been applied first.

Sample No. BRG-150 Lab. No. D-882
Request No. 16873 County Rock Island
ISGS No. 842

ILLINOIS STATE GEOLOGICAL SURVEY

Urbana, IL 61801

REQUEST FOR RADIOCARBON AGE DETERMINATION

(Use separate sheet for each sample and TYPE or PRINT.)

Date June 26 19 81

Name of section or site Beach Ridge

Your sample no. BRG-150 Weight of sample (dry) 1500 gms

Material to be analyzed organic-rich soil or former slough accumulations

Material from which sample was taken base of abandoned beach ridge

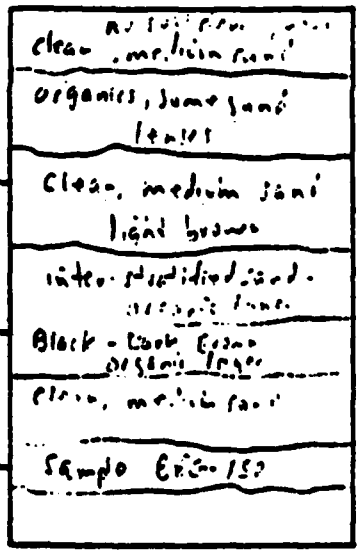
Location: County Rock Island State Illinois

NW ¼ SE ¼ SE ¼ Section 18 Township 77N Range 2W

Direction and distance (km) from town about 8 km southwest of Rock Island

41 ° 27 , 40 " (N) S Lat. 90 ° 38 , 45 " E (W) Long.

Stratigraphic unit, position, and thickness, or relationship with cultural materials (make sketch; use metric units)



Beach ridge was trenched to a depth of 1.8 m and was 7-8 meters long.

Organic-rich layers alternated with layers of clean, medium sand that was occasionally interstratified with organics.

Four major organic layers were exposed in the pit. Ground water at base of pit

Collected by M.L. Barnhardt and P.F. Person Date collected June 5 19 81

Name and address of person requesting analysis Dr. Michael L. Barnhardt
Department of Geography-Geology, ILL. State Univ., Normal, IL 61761

Title of project Investigation of Beach Ridge Development, Rock Island, IL

Significance of sample Sample will date rate of accretion of beach ridge unit. With MB-50 (also submitted) it will help in developing a geomorphic model for this area. This material was at the base of the ridge and should provide a date for when the ridge began to develop over the former slough deposits.

(over)

RADIOCARBON DATE COMMENT FORM

ISGS-842 . BRG-150, Beach Ridge 3670 ± 75 BP*

$\delta^{13}C$ = -25.0‰ PDB

Organic-rich soil from Rock Island Co, 8km SW of Rock Island, Illinois (41°27'40" N, 90°38'45" W). From base of abandoned beach ridge, 1.5m below surface. Coll 1961 by M L Barnhardt and P F Person: subm by M L Barnhardt.

Comment (MLB): Date agrees with ISGS-829 date on beach ridge located farther from river in same area. This date helps establish a timeframe for depositional rates in area.

Base leach was omitted

References cited:

This is a "conventional" radiocarbon date and refers to Radiocarbon Years before the reference year A.D. 1950. The date has been corrected for isotopic fractionation ($\delta^{13}C$), but has not been corrected for the error in the half-life of ^{14}C, or the variations in the atmospheric ^{14}C concentration. For this reason, the age in Radiocarbon Years may not be exactly equal to the age in Solar Years, or Calendar Years. Because use of the B.C. - A.D. time scale implies that the date is in terms of Calendar Years, it is urged that the date not be converted to the B.C. - A.D. time scale unless the above mentioned corrections have been applied first.

Your sample no. BRG-150 Lab. no.* 0-582

Request no.* 16873 County Rock Island

ISGS no.* 842

References to relevant publications on geology of the area None specific to project. Selected general archeological and geomorphic data.

Foreign matter or geologic factors that may contribute to anomalous age (e.g., root penetration, leaching, prolonged exposure to atmosphere) Extensive modern root penetration calcareous materials; seasonally wet

Sampling technique and post-sampling treatment Samples taken from 7-meter long, 1.8 m deep trench from crest down distal slope. Samples air dried then oven-dried at 50C

Is more of this sample available if needed? Yes

Expected age 900 Possible age range from 700 to 1200

Previously determined dates from same or adjacent horizons none

(The remainder of this form is for ISGS use only.)

Authorization for analysis Leon R. Follmer
Chairman, Isotopic Analysis Committee

Date July 18 19 81

RESULTS OF ANALYSIS

Age (ISGS-842) 3760 ± 75 B.P. radiocarbon years

Remarks

$\delta^{13}C_{PDB} = -25.0$ ‰

Analyst Chao-li Jack Liu

Date May 18 19 81

Section of Analytical Chemistry

NOTE: All carbon-14 age determinations will be submitted for publication in "Radiocarbon," published by the "American Journal of Science."

*These numbers will be assigned by the Analytical Chemistry Section, Illinois State Geological Survey.

BETA ANALYTIC INC.

RADIOCARBON DATING, STABLE ISOTOPE RATIOS, THERMOLUMINESCENCE, X-RAY DIFFRACTION
P. O. BOX 248113 - CORAL GABLES, FLORIDA 33124 - (305) 667-5167

August 31, 1981

Dr. Michael L. Barnhardt
Dept. Geography-Geology
Illinois State University
Normal, Illinois 61761

Dear Dr. Barnhardt:

Please find enclosed the results on the soil sample you submitted last week for radiocarbon dating on the Rush Priority basis. We hope this date will be useful in your research.

The sample was pretreated by removal of apparant rootlets, dispersal in hot acid to eliminate carbonates, repeated rinsing to neutrality and bringing to dryness. The large amount of material was submitted to multiple burnings in an enclosed system to extract enough carbon for a meaurement. The soil contained only 0.6% non-carbonate carbon. The benzene synthesis and dating proceeded normally.

Ordinarily, we have to charge a Special Handling fee for low carbon content soil samples, but will forgo it this time since you weren't told in advance. For future samples, please see the back of the enclose price list for a description of these Speical Handling fees.

We are enclosing our statement and your invoice. Would you forward these to the appropriate office for payment. If there are any questions or if you would like to confer on the date, my new telephone number is listed above. Both my partner and I have over twenty years experience in radiocarbon dating. Please don't hesitate to call us if we can be of any help.

Sincerely yours,

Murry Tamers

Murry Tamers, Ph.D.
Co-director

MT/hs
encs.

P.S. I'm also sending a brochure, price list, Update and some sample data sheets for future samples.

BETA ANALYTIC INC.
R.J. STIPP and M.A. TAMERS
UNIVERSITY BRANCH P.O. BOX 248113
CORAL GABLES, FLORIDA 33124
Telephone (305) 667-5167

121

RADIOCARBON SAMPLE DATA SHEET

Please assist us by answering all pertinent questions. It is important for best results.
Please contact us at any time for advice, assistance or discussion of results.

SUBMITTER: M. L. Barnhardt DATE August 24, 1981

ADDRESS: Department of Geography-Geology Illinois State University

COLLECTOR: M. L. Barnhardt DATE August 17, 1981

AFFILIATION: Illinois State University Department of Geography-Geology

COLLECTOR'S SAMPLE CODE NO. BRI-160

INSTRUCTIONS TO LABORATORY
CHECK APPROPRIATE BOXES

NORMAL DELIVERY ☐ RUSH ☒

ANALYZE: RADIOCARBON ☒ $^{13}C/^{12}C$ ☐ $^{18}O/^{16}O$ ☐ CALCITE/ARAGONITE X-RAY ☐

SPECIAL HANDLING: PRETREATMENT ☒ COUNTING ☐ CALCULATIONS ☐ OTHER ☐

SPECIFY contaminated with modern rootlets and snail shell fragments

GEOGRAPHIC LOCATION Rock Island County, IL 3km NE of Andalusia, IL

LATITUDE $41^{o}26'45"$ N LONGITUDE $90^{o}41'5"$ W

TYPE OF MATERIAL buried soil humus--paleosol

WEIGHT 750g ESTIMATED AGE < 15,000 ☒ > 15,000 ☐

EVIDENCE OF CONTAMINATION (ROOT PENETRATION, LEACHING, HUMUS, ETC)

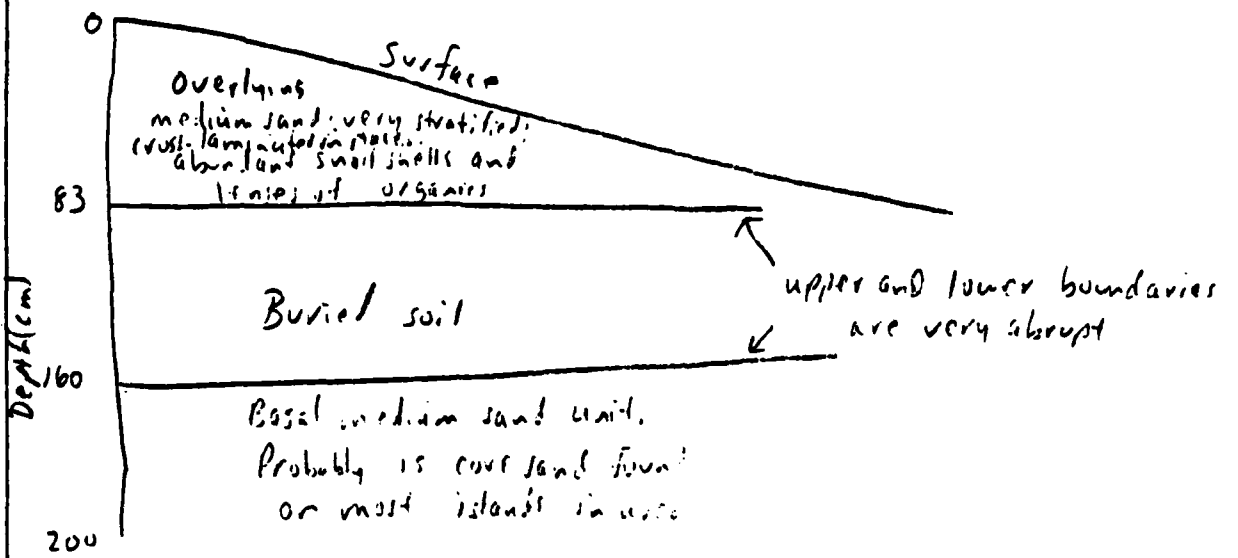
modern rootlets in soil; many snail fragments throughout the soil

COLLECTION, TREATMENT AND STORAGE PROCEDURES soil exposed along 2-meter embankment. Sampled with trowel and stored in plastic-lined disposable bags; air-dried

STRATIGRAPHIC AND ENVIRONMENTAL DETAILS. PUT DRAWINGS AND ADDITIONAL TEXT ON BACK

buried soil is exposed along a 2 meter high beach ridge along the Mississippi River. Sample was collected from the basal 10 cm of the soil above abrupt lower contact. Overlying material in which modern soil is developed is most likely recent sedimentation from floods and dam closure.

FOR ADDITIONAL INFORMATION FROM FRONT PAGE



FOR BETA USE ONLY

BETA NUMBER	_____	INSPECTION	_____
		CARBON %	_____
RECEIVED	_____	PRETREATMENT	_____
ACKNOWLEDGED	_____	TREATMENT	_____
PRIORITY	_____	COUNTERS	_____
ESTABLISHED BY	_____	CALCULATED BY	_____
SCHEDULED FOR PROC	_____	CHECKED BY	_____
RESULT PHONED	_____	SAMPLE LEFT	_____
RESULT MAILED	_____	SAMPLE RETURNED	_____
REPORTED AGE $\pm 1\sigma$	_____	PUBLISHED R.C.	_____

RESULTS OF: $^{13}C/^{12}C$_____ $^{18}O/^{16}O$_____ X-RAY_____

BETA ANALYTIC INC.
UNIVERSITY BRANCH
P.O. BOX 248115
CORAL GABLES, FLA. 33124
(305) 667-5167

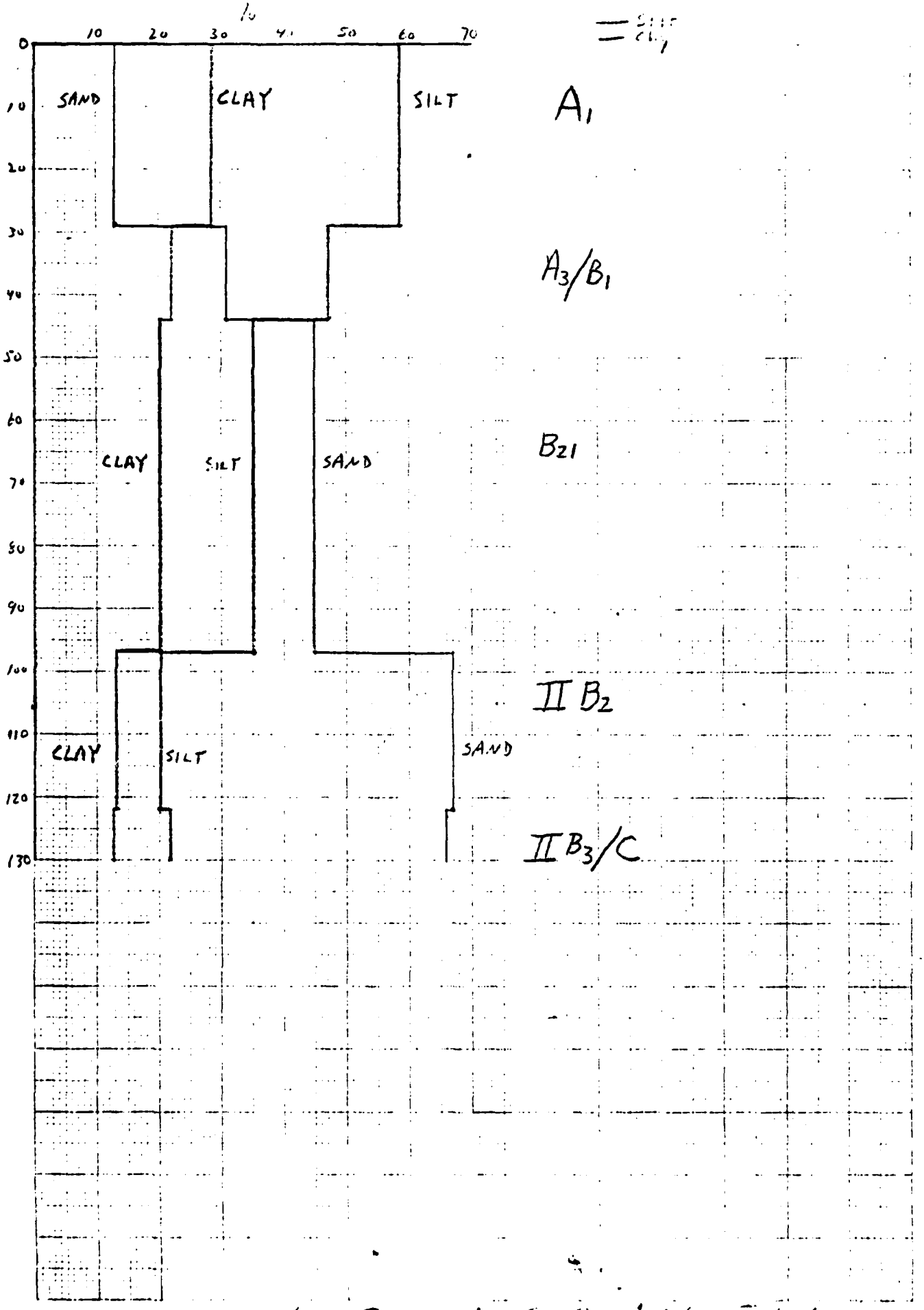
REPORT OF RADIOCARBON DATING ANALYSES

FOR: Michael L. Barnhardt
Illinois State University

DATE RECEIVED: August 26, 1981
DATE REPORTED: August 31, 1981
BILLED TO SUBMITTER'S INVOICE NUMBER

OUR LAB NUMBER	YOUR SAMPLE NUMBER	C-14 AGE YEARS B.P. ± 1σ
Beta-3229	BRI-160	1490 ± 80 B.P.

In agreement with international conventions, radiocarbon dates are calculated using the Libby half-life of 5568 years and 95% of the activity of the NBS Oxalic Acid as the modern standard. The quoted errors are one standard deviation based on the random nature of the radioactive disintegration process. B.P. stands for years before 1950 A.D.



Texture Profile in Site Q, Andalusia, Island

APPENDIX V

SCOPE OF WORK

PART I - Section C, Description/Specification

1. PROJECT OBJECTIVES
The purpose of this Scope of Work is to obtain a cultural resources survey and report of Pool 16 of the Mississippi River. This is being done in compliance with Executive Order 11593 and Public Law 93-291. The work will be a 100 percent cultural resources inventory of selected areas in Pool 16. The objective is to generate a qualitative predictive model for site locations and to evaluate the effects of erosion from maintenance of the pool on the cultural resources within the pool.

2. PROJECT BACKGROUND

2.1 Pool 16 is part of the Mississippi River 9-Foot Navigation Project. It extends in an east-by-northeast direction from just north of Muscatine, Iowa, to the Quad Cities, a distance of 25.7 river miles. The pool is formed by Dam 16, located at river mile 457.2. Dam 16 was placed in operation in July 1937, and a minimum pool level (flat pool) was established at 545 feet above sea level at that time.

2.2 Within Pool 16 the Corps of Engineers owns approximately 4,722 acres of land above the flat pool. Much of this acreage is at the upper end of the pool. There are 231 miles of shoreline (including islands and river banks) in Pool 16 of which the Corps of Engineers owns about 200 miles. About 2,700 acres of Corps land is currently being managed by the US Fish & Wildlife Service.

3. SPECIFICATIONS

3.1. As a <u>minimum</u> the following sources of information are to be consulted for this project:

Iowa State Historic Preservation Officer
Iowa Office of State Archaeologist
Illinois State Historic Preservation Officer

The prospective contractor is expected to demonstrate a knowledge of the more extensive body of literature available for this region. The relevant information obtained will be documented in the draft and final report.

3.2. The contractor will conduct an evaluation of geomorphological changes as a result of the construction and operation of the 9-Foot Navigation Project. The Rock Island District will supply the contractor with two sets of maps indicating the pre- and post- lock and dam land forms as an aid in this. These changes will be located by the contractor on the Great River Environmental Action Team II (GREAT II) base map system and returned to the Rock Island District. A set of the GREAT II maps or their equivalent, will be supplied to the contractor for marking the changes.

PART I - Section C, Description/Specification (Con't)

(The GREAT II map system is in the same scale as the USGS 7-½ minute quadrangle.) The contractor will also conduct geomorphological studies in the pool to determine the amount of overburden in the relevant survey areas so that appropriate sampling methods can be employed.

3.3. The contractor will develop a survey plan to sample a total of 20 percent of Rock Island District land in the pool with 100 percent coverage. This sample will cover as diverse an area as possible and a qualitative predictive model will be developed from it. As discussed here, the qualitative predictive model will be designed to predict the likelihood of sites occurring, given the type of geomorphic structures and ecological setting involved. In addition to this, the contractor will locate the known sites on Federal land in the pool and evaluate their current condition. It is estimated that there are currently less than 25 known sites in this category.

3.4. The Principal Investigator shall be responsible for preparing a report on these investigations. The report shall include, but not be limited to, basic data descriptions including metrics, legal descriptions, using the range and township system, UTM coordinates for all sites, photographs, and drawings necessary to support the author's arguments and as a source of basic information that may find wider use by other archaeologists. The report shall also include possible cultural affiliation, horizontal extent and the likelihood and type of effect on the site if no further remedial action were to be taken.

3.5. The report format shall include, but not be limited to, the following items:

Title Page
Abstract
Table of Contents
Introduction
Environmental Setting
Review of Literature
Interviews with Local Collectors
Methodology
Analysis and Results
Location for Curation of Artifacts
Recommendations
Conclusions
Bibliography
Appendices and Maps: The following shall be included in the appendices: (1) this Scope of Work, (2) vitae of Principal Investigator, project director, and/or field director, (3) proposal, and (4) specific site locations will be included as an appendix and will not be given in the body of the report. A set of USGS maps showing site locations will be provided by the contractor separate from the report.

3.6. The report shall be submitted as a draft (6 copies) and then final (20 copies) in accordance with the schedule in Section F. The draft report shall be complete when submitted. It will be reviewed by RID, the

PART I - Section C, Description/Specification (Con't)

Illinois SHPO, and the heritage Conservation and Recreation Service. The draft will be revised according to comments sent to the contractor by the Contracting Officer. The Contracting Officer will distribute the reports for review, this will not be done by the contractor.

3.7. The contractor will not release any notes, photographs, or reports prior to the acceptance of the final report by the Contracting Officer. After the Contracting Officer has accepted the final report, distribution will not be restricted by either party except that data relating to the specific location of extant sites will be deleted in distributions to the public.

4. RECOMMENDATIONS

The contractor shall make recommendations in the report for each site located as to whether or not it should be tested. Recommendations should also be made regarding the likelihood and kind of future impacts on each site.

5. CURATION

5.1. All artifacts, notes, photographs, and maps generated by this contract are and will remain the property of the US Government.

5.2. After the final report is accepted, any artifacts or cultural material collected during the survey shall be deposited with a recognized institution in coordination with the Rock Island District and State Historic Preservation Officers of the states involved. All artifacts from a given state will be curated in one place. Duplicate notes, maps, and photographs will be made and a complete set stored in each state.

6. REPORTING SCHEDULE

6.1. A draft report is due 180 calendar days after the contractor receives the notice of award from the Contracting Officer.

6.2. The final report is due 260 calendar days after the contractor receives notice of award and will include review comments made on the draft.

7. GOVERNMENT SUPPLIED MATERIAL

The Rock Island District will supply the contractor with the following:

(1) Two sets of maps showing pre- and post- lock and dam landforms.

(2) One set of GREAT II or equivalent maps.

(3) Access to aerial photographs of the pool (false color infrared) at the District Headquarters.

All of the above will be returned to RID upon completion of the contract. Copies of all the maps will be included with the artifacts to be curated.

PART - Section D, Packing & Marking

Not applicable

PART I - Section E, Inspection & Acceptance

The Contractor will not release any notes, photographs, or reports prior to the acceptance of the final report by the Contracting Officer. After the Contracting Officer has accepted the final report, distribution will not be restricted by either party except that data relating to the specific location of extant sites will be deleted in distributions to the public.

PART I - Section F, Deliveries or Performance

1. TIME OF DELIVERY (1974 APR). Delivery is REQUIRED to be made in accordance with the following schedule:

ITEM NO.	QUANTITY	TIME (within the number of days stated below after date of contract.)
0001	Job	180 draft report 260 final report

Bids offering delivery of each quantity within the applicable delivery period specified above will be evaluated equally as regards time of delivery. Bids offering delivery of a quantity under such terms or conditions that delivery will not clearly fall within the applicable delivery period specified above will be considered nonresponsive and will be rejected. When a bidder offers an earlier delivery schedule than that called for above, the Government reserves the right to award either in accordance with the REQUIRED schedule or in accordance with the schedule offered by the bidder. If the bidder offers no other delivery schedule, the delivery schedule stated above shall apply.

1.1 BIDDER'S PROPOSED DELIVERY SCHEDULE

ITEM NO.	(To be Completed by Bidder) QUANTITY	TIME (within the number of days stated below after date of contract.)
_____	_____	_____

PART I - Section F, Deliveries or Performance (Con't)

Attention is directed to paragraph 10(d) of the Solicitation Instructions and Conditions, which provide that a written award mailed or otherwise furnished to the successful bidder results in a binding contract. Any award hereunder, or a preliminary notice thereof, will be mailed or otherwise furnished to the bidder the day the award is dated. Therefore, in computing the time available for performance, the bidder should take into consideration the time required for the notice of award to arrive through the ordinary mails. However, a bid offering delivery based on date of receipt by the Contractor of the contract or notice of award (rather than the contract date) will be evaluated by adding five days for delivery of the award through the ordinary mails. If, as so computed, the delivery date offered is later than the delivery date required in the invitation, the bid will be considered non-responsive and rejected. (DAR 7-104.92)

PART I - Section G, Contract Administration Data

Not applicable.

PART I - Section H, Special Provisions

1. CONTRACTING OFFICER"S REPRESENTATIVE (COR). The Contracting Officer may appoint an individual to act as his representative for this contract. Such representative shall direct the technical effort being performed within the Scope of Work. This representative is not authorized to issue instructions which change the scope of technical requirements, the work to be performed, or the compensation or period of performance of the contract. Such changes, if any, shall be made only by the Contracting Officer. Written progress reports will be submitted to the Contracting Officer the 15th of each month during analysis. Field conferences will be held as needed.

PART I - SECTION H, Special Provisions (Continued)

2. CONTRACTOR'S PROGRAM MANAGER. The Contractor shall designate a Program Manager who will be the Contractor's authorized supervisor for technical and administrative performance of all work performed hereunder. The Program Manager shall serve as liaison between the Contractor and the USA Engineer District, Rock Island, under this contract.

3. TRAVEL. The Contractor shall use tourist class arrangements (or equal) for all travel to be performed under the contract. Travel in the United States required for performance of contract work will be made at the discretion of the Contractor. Travel outside the continental limits of the United States will not be performed.

4. IDENTIFICATION OF RESTRICTED RIGHTS COMPUTER SOFTWARE (1977 APR). The offeror's attention is called to the requirement in the "Rights in Technical Data and Computer Software" clause that any restriction on the Government concerning use or disclosure of computer software which was developed at private expense and is to be delivered under the contract must be set forth in an agreement made a part of the contract, either negotiated prior to award or included in a modification of the contract before such delivery. Therefore, the offeror, is requested to identify in his proposal to the extent feasible any such computer software which was developed at private expense and upon the use of which he desires to negotiate restrictions, and to state the nature of the proposed restrictions. If no such computer software is identified, it will be assumed that all deliverable computer software will be subject to unlimited rights. DAR 7-2003.76

5. RIGHTS IN TECHNICAL DATA AND COMPUTER SOFTWARE (1979 MAR).

(a) Definitions.

(1) Technical Data means recorded information, regardless of form or characteristic, of a scientific or technical nature. If may, for example, document research, experimental, developmental, or engineering work; or be usable or used to define a design or process or to procure, produce, support, maintain, or operate material. The data may be graphic or pictorial delineations in media such as drawings or photographs; text in specifications or related performance or design type documents; or computer printouts. Examples of technical data include research and engineering data, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications and related information and computer software documentation. Technical data does not include computer software or financial, administrative, cost and pricing, and management data or other information incidental to contract administration.

(2) Computer - a data processing device capable of accepting data, performing prescribed operations on the data, and supplying the results of these operations; for example, a device that operates on discrete data by performing arithmetic and logic processes on these data, or a device that operates on analog data by performing physical processes on the data.

APPENDIX VI

COMMENTS

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61201

REPLY TO
ATTENTION OF:

NCRED-PB

1 [illegible] 1981

Dr. Edward B. Jelks, Director
Midwest Archaeological Research Center
Illinois State University
Normal, Illinois 61761

Dear Dr. Jelks:

We have completed our review of the initial draft report "Preliminary Cultural Resource Survey of Selected Areas in Navigation Pool 16, Mississippi River," which was prepared under Contract No. DACW25-81-C-0046.

Our specific comments are attached as Inclosure 1; comments from the following agencies are also included: National Park Service-Interagency Archaeological Services (Inclosure 2), Iowa State Historical Department-Division of Historic Preservation (Inclosure 3), Iowa Office of State Archaeologist (Inclosure 4), and the Illinois Department of Conservation (Inclosure 5). We are returning one copy of the draft (Inclosure 6) with some editorial changes marked. This is included to aid in your revision but should not be considered a thorough editing job on our part.

The overall reaction to your report is generally favorable and most of the criticisms expressed are directed at the reporting of the work rather than the work itself. We realize that you were delayed in the field by high water and commend you for your efforts at bringing the draft in on time. We also realize that if you had had the time for analysis originally scheduled, the draft would have been more polished.

We do have a few general comments on the draft in addition to those in the inclosures. The geomorphological and historical sections are acceptable except as stated in the inclosures; the prehistoric section is not. It is badly in need of editing, both for grammar and continuity. For example, look at page 50, paragraph 2, and page 62, paragraph 2. This is a common problem throughout the prehistoric section. The site descriptions also need to be expanded. For example, we do want to know what we are dealing with when reference is made to "some prehistoric artifacts." Artifact tables should be included as an appendix and analysis of artifact significance should be in the body of the report. Likewise, when reference is made to two historic ceramic types (blue shell edge and sponge spatter) the relative percentage of the two and their periods of popularity might be stated. It would also help if the various sections were edited for continuity with each other.

NCRED-PB
Mr. Edward B. Jelks

If you have any questions about the comments or would like to go over them in more detail, please call Mr. Roy Eichhorn at 309/788-6361, Ext. 6349. As stated earlier, we are pleased with the results of the work and look forward to the polished version of the report.

Sincerely,

F. W. Collins

6 Incl
As stated

F. W. COLLINS
Authorized Representative
of the Contracting Officer

Sheet 1 of 4

ROCK ISLAND DISTRICT

Branch/Office NCRED-PB(EA) Reviewer Eichhorn/Smith Ext. No.6349/6344

Subject: Review of DRAFT: Preliminary Cultural Resource Survey of Selected Araes in Navigation Pool 16 Mississippi Riv Date 25 Sep-4 Nov 81

CMT. NO.	Dwg. or Pars. No.	COMMENT
1	Pg V & 14	add "Canal" after Illinois and Mississippi for stream guage data table
2	abstract	The abstract should be rewritten. As it now stands the abstract does not specify what land in Pool 16 is involved, why the survey was done, or who it was done for. The abstract should also be expanded since it will serve as the NTIS summary.
3	Pg 1 para 1	The percent of survey coverage given here does not match that given in the abstract.
4	Pg 1 para 1	There is no mention of evaluating the effects of erosion from mainenance of the pool on the cultural resources within the pool (SOW Pg 3).
5	Pg 2 para 1	Were the 11 sites previously recorded or are they new sites?
6	Pg 5 para 2	This paragraph implies that all terraces are either Late Pleistocene or Late Holocene. Is this really the case?

Sheet 2 of 4

ROCK ISLAND DISTRICT

Branch/Office NCRED-PB(EA) Reviewer Eichhorn/ Smith Ext. No. 6349/6344

Subject: Review of DRAFT report, Pool 16 Date 25 Sep- 4 Nov 81

CMT. NO.	Dwg. or Para. No.	COMMENT
7	Pg 7 line 11	Was the 1892 topographic map produced by the Mississippi River Commission?
8	Pg 11 para 2	Would "morphological" be more appropriate than "morphologic" ?
9	Pp 12-33	Add the ISU site numbers to the subheadings as appropriate for clarity.
10	Pg 13 line 8	Insert "an" after "by" in this sentence.
11	Pg 25	The remarks section needs editing. A map illustrating the historic sites identified in the documents would be helpful. Are any of the historic components found by the survey crew described in the documents?
12	Pg 40 para 2	This paragraph doesn't read well. Consider rewriting it.
13	Pg 44 para 2	The reference to a 20% sample should be made earlier in the report.
14	Pg 46 Results	Is the reference to MC-75 and its assignment by the IAS correct?

Sheet 3 of 4

ROCK ISLAND DISTRICT

Branch/Office NCRED-PB(EA) Reviewer Eichhorn/Smith Ext. No 6349/6344

Subject: Review of DRAFT report, Pool 16 Date 25 Sep- 4 Nov 81

CMT. NO.	Dwg. or Para. No.	COMMENT
		Please use the 11 or 13 state designator with site numbers since we are dealing with 2 states.
15	Pg 48 para 2	Why are we using the term soil pit in this fashion? How big are these excavations?
16	Pg 54 para 3	This is a confusing paragraph. Expand on site #4, why is it a site, what's there? Tie in the references to the unnamed creek. The relationship between it and site #4 are vague.
17	Pp 56-57	Site ISU #1: The presence of sandstone in a shell midden in this area is considered significant in that it's not locally available; suggest you look at Van Dyke et al on 11RI337.
18	Pg 59 top	Relate the sentence on blue shell-edge to ceramics recovered.
19	Pg 60 top	This sentence is incomplete. The phrase "Discovered by MARC archaeologists" hangs in the air. Should this be preceded by something?

Sheet 4 of 4

ROCK ISLAND DISTRICT

Branch/Office NCRED-PB(EA) Reviewer Eichhorn/Smith Ext. No. 6349/6344

Subject: Review of DRAFT report, Pool 16 Date 25 Sep- 4 Nov 81

CMT. NO.	Dwg. or Pars. No.	COMMENT
20	Pg 60	On what basis is site ISU #5 assumed to be Archaic?
21	Pg 63	ELABORATE! What kind of prehistoric material is being referred to?
22	Pg 65	Was the Iowa Office of State Archaeologist consulted?
23	Pp 87-88	The device referred to is called a braille.
24	General	There are no site specific recommendations; these should be included in reference to further data recovery interest and the effects of reosion (SOW Pg 5).
25	appendices	The appendices are incomplete (SOW Pg 4). suggest you use the order recommended in the Lower Rock River Survey report.
26	General	The site descriptions should be beefed up. It appears that there is more that can be done in the way of interpretation and inference than one finds in this draft.

United States Department of the Interior
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGIONAL OFFICE
655 Parfet Street
P.O. Box 25287
Denver, Colorado 80225

IN REPLY REFER TO:

H2415 (RMR) CR

NOV 6 1981

Mr. Doyle W. McCully
Chief, Engineering Division
Department of the Army
Rock Island District, Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Attention: Mr. Roy Eichhorn

Dear Mr. McCully:

In response to your request of September 24, 1981, we have completed our review of "Preliminary Cultural Resource Survey of Selected Areas in Navigation Pool 16, Mississippi River." Enclosed please find copies of individual reviews.

The incomplete state of the report is recognized; however, the investigators have presented a commendable study. The derived model for prediction of prehistoric site location is supportable and useful. We only regret that it does not provide a means for assessing the research potential of discovered sites. The complete and edited version of this report should provide useful results and an archeological contribution.

Thank you for allowing us to review this report; we trust that our comments prove useful.

Sincerely yours,

Jack R Rudy
Chief, Branch of Interagency Archeological Services

Enclosures

UNITED STATES GOVERNMENT

memorandum

DATE: November 6, 1981

SUBJECT: Review of the draft report on "Preliminary Cultural Resource Survey of Selected Areas in Navigation Pool 16 Mississippi River" by M. Barnhardt et al.

TO: Supervisory Archeologist Hoffman JJH

The abstract is horrible!

Need a large scale map showing where Pool 16 is in relation to Iowa and Illinois. What counties is Pool 16 in? State site numbers should be included along with the ISU numbers - especially if only state numbers are to be used on the accompanying maps. I would guess that the authors had probably not received the numbers from the state when this draft was prepared.

Page 15: Should always include site numbers for radiocarbon dates if dates are from an archeological site regardless if the date is for geomorphological purposes.

Page 20 & 27: Why not do a dendro on the elm trunk? Several dendro master curves are available for the area back to at least @ AD 1200. (Bell 1951, 1952 - Kincaid Site Baerreis and Bryson 1965 - Wisconsin Archeology; Munson 1966 - Trans of Illinois State Academy; Estes 1969 - PhD dissertation - Department of Botany, SIU). This would provide an additional (and I believe better) way of establishing (1) age of the tree(s) in absolute years B. P. and, therefore (2) age of sediments and original ground surfaces. etc.

Page 22: Suggest the author's look at Thompson and Bettis 1979(?) Holocene article in the Iowa Archeological Society Journal. As I recall, they found the same rapid and thick sedimentation after @ 1500 B.P. and especially in the last 200 years.

Page 44: Good sampling design - especially on page 45. Glad to see someone who isn't afraid to change the design in light of what they are learning as they go along (i.e., the geomorphological data).

Page 56: MARC archeologists?

Site descriptions are inadequate and do not include collecting/testing methods used nor any artifact descriptions and/or drawings. As far as I am concerned, the report is incomplete without this information and should be rejected out of hand. State numbers should be included with ISU numbers.

Goood historical overview.

Page 95: Very reasonable and realistic recommendations.

Summary: Other than the above criticisms (mostly minor) I believe this to be a pretty good and straight forward report. The observations about the archeology viz the geomorphology should be read and used by anyone doing further work along the river - to ignore it would be stupid.

United States Department of the Interior
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGIONAL OFFICE
655 Parfet Street
P.O. Box 25287
Denver, Colorado 80225

IN REPLY REFER TO:
H2415 (RMR)CR

Memorandum

To: Review Coordinator JFH

Subject: Review of, "Preliminary Cultural Resource Survey of Selected Areas in Navigation Pool 16, Mississippi River."

Subject report is a draft prepared by Illinois State University under contract with Rock Island District, Corps of Engineers. The study area consists of Federal lands within a 40km reach of the Mississippi River between Lock & Dam 16 and Arsenal Island. Purposes of the study are to conduct a 20% survey of the area for prehistoric and historic sites, clarify the erosional/depositional environment of the pool, and integrate the geomorphological and archeological data into a qualitative predictive model for resources in the pool.

The erosional/depositional problem is focused on the period immediately before closure of Dam 16, and the subsequent era. Various techniques are used to reach some rather surprising conclusions regarding rapid deposition in the pool. For one technique, dendrogeomorphology, the investigators may wish to clarify a point. Give the environmental setting, the counted rings of sampled trees may not necessarily be annual rings. There appears to be a bit of editoral confusion wherein the descriptions of Island 317 bank exposure (site H) on page 19-20 are repeated on page 23.

The sample survey of the pool was originally designed to be based on randomly selected tracts within three broad strata. Results of the geomorphological study showed that the design could not be used for surface survey; recent deposition made it impossible. Thus, purposive survey with shovel testing was used in the three strata. Results are identification of 11 previously unrecorded sites, and relocation of one previously recorded. These are largely defined from prehistoric materials, although historic materials are occasionally present. One prehistoric site, a shell midden, was radiocarbon dated within the Archaic period. The investigators assume two similar sites to be also Archaic. Another prehistoric site maybe Late Woodland, but the balance are rather diffuse occupations of undetermined age and functions. The lists of collected surface artifacts cited on page 56 do not appear in this copy of the report.

The investigators present an entertaining historic survey of the pool area. The figures referenced in the historic discussion do not appear in this copy of the report. Despite the colorful history, the investigators were unable to firmly identify structural remains of the period in the study area. The predictive model formulated by the investigators expects a full temporal range of human activity within the pool; from Archaic times to 20th Century Euroamerican. Further, the model predicts that most sites are limited activity areas once located on elevated ground, but now buried under recent deposition. From this model, investigators present two major recommendations for future site identification in the pool area. Both the model and the recommendations are reasonable and useful. Unfortunately, they contain no means for assessing the meaning and scientific potential of discovered sites.

The present draft is incomplete and requires minor editing. The content is generally useful for predicting site locations, but not for assessing the significance of located sites.

IOWA STATE HISTORICAL DEPARTMENT
DIVISION OF HISTORIC PRESERVATION

ADRIAN D. ANDERSON, DIRECTOR
STATE HISTORIC PRESERVATION OFFICER

October 30, 1981

Mr. Doyle W. McCully, Chief
Engineering Division
US Army Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Re: NCRED-PB; Review of and comment on DRAFT "Preliminary Cultural Resource Survey of Selected Area in Navigation Pool 16 Mississippi River", by M.K. Barnhardt, et. al.

Dear Mr. McCully:

The opportunity to review and comment on the draft report referenced above is appreciated. Review by the Division has been done from the perspective of the technical quality of the report and the adequacy of the survey work in the context of the scope of work for the survey project. The Division offers the following comments and suggestions:

1. Typographical errors were noted on the following pages:
   page 18, line 10
   page 41, line 2
   page 42, line 3
   page 49, line 5
   page 65, paragraph 3, line 8
   This probably does not identify all of such errors as our review did not emphasize this aspect of the report.
2. The Abstract should be modified to include the salient results of the work; e.g. the conclusions of the predictive model, the conclusions of the interpretive model of the geomorphic processes.
3. Page 1, lines 2 and 3; is "geomorphological study" redundant: Should it be geomorphological analysis or geomorphic study?
4. Page 2, line 4; "known" should apparently be unknown.
5. Page 3, line 1; was Pool 16 "established" or created in 1937? The Act of Congress established a mechanism to create the pools; but the pools were not physically present until the gates were closed.

6. Page 4, last 3 lines; the lowest terrace is implied to be quite old. Perhaps it could be described as the lowest major terrace. Or, are there likely to be no Holocene age terraces?
7. Page 7, line 12; "Great II" should be GREAT II, and should probably be spelled out the first time used; i.e.: Great River Environmental Action Team. References should be added to this section.
8. Page 11, paragraph 1, last 3 lines. It is not clear which island is being referred to. Please clarify.
9. Page 12. Map references, and locations by approximate river mile need to be added to this section to allow the reader to follow the discussion more easily but with the information kept at an appropriate level of generalization. The shell midden (Location A) should be given a site number if there was anything artifactual recovered or inferred to exist.
10. Page 16a. The photographs, generally, did not copy well. It is requested that care be taken in reproduction of the final version to ensure interpretable photos.
11. Page 19, line 2; does the stability of a depositional process necessarily imply a lengthy period of time: Perhaps there is a difference of opinion of how long a "very long period" is. This stratigraphic section is important to the argument of landscape stability.
    Elaboration of this point would strengthen the argument.
12. Page 19, paragraph 3 and Photo 2. Photo 2 should be labelled to clearly show the major strata. As a matter of style all "Photos" should be Plates or Figures, and the view labelled as to major strata.
13. Page 21, paragraph 2, line 4; is "valid" intended to be invalid?
14. Page 23; this page seems to repeat most of page 19. Repetitious material should be deleted appropriately.
15. Page 40. The information on this page overlaps somewhat with that on page 3. Perhaps the overlapping content on pages 3 and 40 could be subsumed under the introduction to the report.
16. Page 43, paragraph 2, and several pages on inserts following page 43. The perfunctory adoption of several pages synthesizing the previous research in the area is apparently an expedient. Despite the scholarly nature of the material adopted it would be more prudent, in our opinion, to adopt it by reference and proceed with the present consultant's version of a synthesis. Our observaiton is that there is certainly a perspective

to be gained by such originality, and this can not be conveyed by such adoption of previous work, no matter how complimentary such adoption may be toward other investigators or their work.

17. Page 46. Results of the Survey. It is highly desirable to have site numbers of record in the draft report if at all practicable. Such site numbers must be contained in the final version of the report.
18. Page 49, paragraph 2, line 4; a word is missing prior to "F".
19. Page 50, and on, at least through page 58. This section needs careful editing. Also, the absolute chronology should be discussed in detail, perhaps a new section on chronology and natural stratigraphy, but acceptance of C-14 dates on shell has been made traditionally with considerable reluctance. This chronology is a very important aspect of the whole modeling process and merits detailed explanation.
20. Page 58. Artifacts described here and elsewhere should be illustrated.
21. Page 60, paragraph 1, line 2; this sentence is incomplete.
22. Page 65, paragraph 3, line 8; it is our opinion that the Office of State Archaeologist provided information about archaeological sites. It is requested that this be verified by the consultant. Is it possible that the Office of State Archaeologist was not consulted regarding sites in the study area? Also, DHP checked for historical site information but found none in its records.
23. Pages 87-98; these are absent from the reviewed draft, thus the draft "predictive model" and "conclusions and recommendations" could not be reviewed. The Division requests the opportunity to review and comment on these sections before the final report is submitted.

Placing the draft report in the context of the expected technical quality of reports of this nature, it is our opinion that the report may have been hastily prepared; there are sections required by the scope of work which are not present in the report, and the editing of sections of the draft and completeness of other sections of it is of low technical quality. The survey work performed appears to be adequate to 1) provide an inventory of cultural resources, albeit an incomplete one; 2) generate a qualitative predictive model for site locations, for which there seems to be ample information; and 3) evaluate the effects of erosion from maintenance of the pool on the cultural resources within the pool, for which there seems to be abundant information of substantive effects.

The Division looks forward to reviewing the predictive model and conclusions sections of the report, and to reviewing a complete and well-edited final version of the report.

The Division requested that the Office of State Archaeologist review the draft and provide its comments to the Division; their comments are attached for your use and information.

Sincerely,

Adrian D. Anderson, Director
State Historic Preservation Officer

ADA/bb
cc: Roy Eichhorn

...versity of Iowa
Iowa City, Iowa 52242

Office of the State Archaeologist
Eastlawn

(319) 353-5175, 353-5177

October 21, 1981

Mr. Stanley Riggle
Department of State Historic Preservation
26 East Market Street
Iowa City, Iowa 52240

Dear Stan:

We have examined the draft report by Barnhardt, et al., on Mississippi River Navagation Pool 16 and have found it to contain some shortcomings.

The main difficulties (lack of site numbers, lack of reference to relevant studies in the area, and lack of awareness of previously recorded sites in the region) relate to the fact that the contractor did not check with the site records clerk before starting the project.

Approval of the report should be withheld until these matters are addressed and official site numbers assigned.

A few other items noted in the review are as follows:

1. Page 42. The name of the Office of the State Archaeologist of Iowa is incorrectly stated.
2. Page 42. The proper designation for the site near Muscatine is 13MC75.
3. * Page 47. The Office of the State Archaeologist was not contacted regarding information pertinent to the survey. Apparently members of the Quad Cities chapter of the Iowa Archeological Society were not contacted.
4. Pages 87-98 are missing from the draft.

I hope these comments will be useful to you in providing an appropriate response. If you have any questions, please feel free to contact me.

Sincerely,

Duane C. Anderson

Duane C. Anderson
State Archaeologist

DCA:bh

* discussed w Joe Tiffany by SR 10/81; comment should be considered deleted. SR

Illinois Department of Conservation
[illegible] STREET • SPRING

September 29, 1981

Mr. Doyle W. McCully
Chief, Engineering Division
Corps of Engineers
Clock Tower Building
Rock Island, IL 61201

Dear Mr. McCully:

The draft report Preliminary Cultural Resource Survey of Selected Areas in Navigation Pool 16, Mississippi River was reviewed in this office. The technical sufficiency of it seems adequate and I have only a few comments on composition.

The copy received had two identical single spaced insertions; one inserted between pages 41-42 and the other between 42-43. It is assumed this is the section of Van Dyke and Overstreet referred to at the end of the unit on page 43. Even when placed in its proper context it seems excessive description and mainly discussion of the 19th century character of the Davenport Academy. The previous work in the area appears adequately summarized otherwise.

As could be expected in an area of such extensive vegatation there is a striking correlation between corn fields and site locations. Although it is pointed out that the sites found represent only a very small sample of the probable ones, the case could be strengthened more by greater discussion of the fact that nearly all sites in the area are buried. The importance of sub-surface examination of areas for any future projects should be made more emphatic.

Sincerely,

Margaret K. Brown
Staff Archaeologist
Historic Sites Division

MKB/bk

Sheet 1 of 6

ROCK ISLAND DISTRICT

Branch/Office NCRED-PB(EA) Reviewer Eichhorn Ext. No. 6349

Subject: Review of REVISED DRAFT report, Pool 16 Date 7 Apr 82

CMT. NO.	Dwg. or Para. No.	COMMENT
1	Title Page	The contract number shown is incorrect; it should read DACW25-81-[illegible] Please include a "funded by" statement on the front cover.
2	Absract line 3	Please use a North/South limit for the pool boundary, point out that the survey was intended to be for 20% of Federal land and that it ended up being 25%. The abstract would be better if slanted toward the theoretical rather than the descriptive. We would like to use the abstract verbatim for inclusion in NTIS summaries.
3	Pg 1 para 1	Redefine the pool boundaries; line 4: add "the" between with and comple[illegible]
4	Figure 1	Redraw Figure 1, suggest you use Rock Island instead of Moline.
5	Pg 8 para 4	". . . Pool — area" Should this be Pool 12?
6	Pg 8	The discussion here is based on pool levels as they now exist. How is this related to the prehistoric situation?
7	Pg 10	The survey was to be a sample of 20% of the topographic units, not

Sheet 2 of 6

ROCK ISLAND DISTRICT

Branch/Office NCRED-PB(EA) Reviewer Eichhorn Ext. No. 6349

Subject: Review of REVISED DRAFT report, Pool 16 Date 7 Apr 82

CMT. NO.	Dwg. or Para. No.	COMMENT
		of cultural resources. Expand the discussion of sampling technique.
		Describe the stratification in terms of perceived ecotone variation
		and how this relates to the cultural resources. Was the stratifi-
		cation keyed to current settings or was the prehistoric landscape
		considered?
8	Pg 10 para 1	The discussion shifts from past to present tense without warning.
9	Pgs 4-11	The inclusion of this section is a considerable improvement over the
		original draft as it improves the clarity and continuity.
10	Pg 11	Add a north arrow. The scale, $\frac{1}{180,000}$, should be drawn.
11	Pg 13	Add a scale.
12	Pg 14	Please identify what the 1892 map is; the reference to Peterson 1978
		for the GREAT II base maps is incorrect, Peterson was only responsible
		for the Cultural Resource Work Group Appendix Technical Report #1
		(the Literature Search).

ROCK ISLAND DISTRICT

Branch/Office NCRED-PB(EA) Reviewer Eichhorn Ext. No. 6349

Subject: Review of REVISED DRAFT report, Pool 16 Date 7 Apr 82

CMT. NO.	Dwg. or Pars. No.	COMMENT
13	Pg 15	Add a scale and north arrow.
14	Pg 18	The 25% should be referenced under revised strategy on pg 10.
15	Pg 19 para 1	What kind of data?
16	Pg 44 line 2	"underdeveloped" should be "undeveloped".
17	Pg 45 para 2	"Theler" is mispelled.
18	Pg 47	What were the "careful laboratory procedures carried out by ISU" which "inspire confidence in the data"?
19	Pg 47	US Corps of Engineers should be US Army Corps etc. The third paragraph is somewhat redundant given the introductory paragraph on page 45. Consider consolidating.
20	Pg 63	The dam at the lower end of the pool is lock and dam 16 not 15.

ROCK ISLAND DISTRICT

Branch/Office NCRED-PB(EA) Reviewer Eichhorn Ext. No. 6349

Subject: Review of REVISED DRAFT report, Pool 16 Date 7 Apr 82

CMT. NO.	Dwg. or Para. No.	COMMENT
21	GENERAL	Consider using named sites such as the "gas station site" only for loci with site file numbers.
22	Pg 68 Fig 29	Add references for data.
23	Pg 72 para 4	There is a word missing.
24	Pg 77	The last paragraph would best be included in the summary on page 78.
25	Pg 78	Include the first paragraph as part of the summary.
26	Pg 88	Typo: One one Plaeo-Indian site . . . .
27	Pg 169	Typo: "middle" debris should be "midden".
28	Pg 175	If 9 shells with button blanks are present then an historic component is probably present at the site.
29	Pg 175	The use of "left descending bank" would be more appropriate than "south"

Sheet 5 of 6

ROCK ISLAND DISTRICT

Branch/Office NCRED-PB(EA) Reviewer Eichhorn Ext. No. 6349

Subject: Review of REVISED DRAFT report, Pool 16 Date 7 Apr 82

CMT. NO.	Dwg. or Para. No.	COMMENT
30	Pg 177	Reorient the map so that north is up.
31	Pg 178	Site 11RI-510: How does scratched as a ceramic decorative technique
		contrast with trailed or incised? Please explain the term "monochrome
		sponge/spatter" ceramics. Wouldn't a date range of 1845-1855 be
		more appropriate for the historic component than "early to middle"
		nineteenth century? Describe the "uncertain" distal fragment. Add a
		discussion of disturbances to the prehistoric from the historic com-
		ponent to this site and the other sites that have historic and pre-
		historic components (where appropriate).
32	Pg 179	The last three sentences are confusing, was the area surveyed twice?
		"downstream" would probably be more appropriate than south.
33	Pg 188	The dual headings Prehistoric/Historic are helpful, these should
		be used in all the site descriptions that have both categories.
		There is no mention of blue-transfer sherds in the artifact inventory.
		Does this refer to the purple transfer sherd? Surely we can come up
		with a tighter date range on this than early to middle 19th century.

ROCK ISLAND DISTRICT

Branch/Office NCRED-PB(EA) Reviewer Eichhorn Ext. No. 6349

Subject: Review of REVISED DRAFT report, Pool 16 Date 7 Apr 82

CMT. NO.	Dwg. or Para. No.	COMMENT
34	Pg 191	Reorient map so that north is up.
35	Pg 197	Reorient map so that north is up.
36	Pg 198	Good visibility in mature corn would be unusual, is this correct?
37	Pg 199	While the historic material is admittedly meager doesn't it at least suggest an historic component dating between 1830 and 1855?
38	Pg 204	Sites 13Mc-13 and 13Mc-14 appear to be fairly close together but that would not be apparent from the site descriptions.
39	Pgs 208-211	What is the "g" category on the graphs? Is this gram weight?
40	GENERAL	There is still a great deal that can be done with the data on hand in terms of interpreting past behavior.

APPENDIX VII

CURRICULA VITAE FOR EDWARD B. JELKS AND DAVID L. CARLSON

EDWARD B. JELKS

U.S. Citizen; born in Macon, Georgia, 1922; married

EDUCATION

B.A. (English) 1948, University of Texas at Austin
M.A. (Anthropology) 1951, University of Texas at Austin
Ph.D. (Anthropology) 1965, University of Texas at Austin

POSITIONS HELD

Smithsonian Institution:	Archeologist (1950-53)
National Park Service:	Archeologist (1953-56) Supervisory Archeologist (1956-58)
University of Texas: at Austin	Director, Texas Archeological Salvage Project (1958-65) Lecturer in Anthropology (1963-65)
Southern Methodist: University	Associate Professor (1965-68)
Illinois State University:	Professor (1968-present) Coordinator for Anthropology (1968-74) Acting Chairman, Department of Sociology-Anthropology (1974-75)

MILITARY SERVICE

On active duty in U. S. Navy January, 1942 to October, 1945

MAJOR SCHOLARLY INTERESTS

Archeological Theory and Method

North American Prehistory

Historical Archeology

Ethnohistory of the Southern Plains & Southeastern U. S.

Applied Statistics

ADMINISTRATIVE EXPERIENCE

I have held administrative positions since 1951 in the Federal Civil Service, at The University of Texas, at Southern Methodist University, and at Illinois State University: altogether, more than 25 years of continuous administrative dealings with Federal, State, and University officials, and with field, laboratory, and office employees.

Administrative responsibilities have included budgeting, research design, curriculum development, staffing, planning and implementation of field expeditions, report preparation, editing, liason between universities and Government agencies, and public relations.

TEACHING EXPERIENCE

Lower Level Courses Taught

General Anthropology
Introductory Cultural Anthropology
Introductory Physical Anthropology
Introductory Archeology
Prehistory of North America
Old World Prehistory
Texas Prehistory
Archeological Field School
The Nature of Man (SMU's interdisciplinary orientation course for Freshmen)

Upper and Graduate Level Courses Taught

History of Anthropological Thought
Archeological Theory
Historical Archeology
Key Concepts in Anthropology
Member of team-taught seminars in cultural anthropology, physical anthropology, and archeology
Have served on numerous thesis committees

RESEARCH EXPERIENCE

Between 1950 and 1965 I was engaged in full-time research on a number of different projects. Since 1958 I have administered research grants and contracts from the National Science Foundation, the National Park Service, the Canadian National Parks Branch, the State of Texas, the State of Illinois, the U. S. Military Academy, and other agencies, totaling well in excess of $1,000,000. I was director of the following projects unless otherwise indicated.

River Basin Salvage Projects, 1950-54; 1956-69. Included were preliminary surveys of some 45 reservoirs in Texas, Arkansas, Louisiana, and Kansas, and the excavation of approximately 100 archeological sites. I personally supervised the excavation of about 30 sites; the others were dug by archeologists working under my general direction. The sites spanned a broad spectrum of aboriginal cultures: Paleo-Indian, Archaic, Neo-American, and Historic; campsites, villages, bison jumps, ceremonial centers, and cemeteries; rockshelters, mounds, quarries, burned rock middens, and stratified alluvial sites. Also excavated were 18th and 19th century Spanish Colonial sites and early to mid-19 century western pioneer sites. Reports were prepared for all the surveys and all the excavated sites (a total of approximately 150 reports). I wrote many of the reports personally, co-authored several, and edited all of them. Several dozen have been published.

Jamestown, Virginia, 1954-56. I was assistant to John L. Cotter on this project, an extensive subsurface expoloration of 16th century Jamestown followed by complete excavation of major structures.

Yorktown, Virginia, 1955. This series of exploratory excavations located and identified components of the U. S. and French defensive earthworks of the Battle of Yorktown.

Amistad Paleoecology Study, 1964-66. I co-directed this interdisciplinary study, funded by the National Science Foundation (Grant No. GS-667), which reconstructed prehistoric environments and human ecology in western Texas and northern Coahuila, Mexico, over the past 10,000 years.

Archeology and Ethnohistory of the Wichita Indians, 1965-67. I co-directed this study of archeological and documentary resources relative to the Wichita, which was funded by the National Science Foundation (Grant No. GS-964).

Signal Hill, Newfoundland, 1965-67. This project, funded by the Canadian Government, involved two summers of excavation at Signal Hill National Historical Park, a British military post of the 1790-1860 period.

Texas Historic Sites, 1965-69. Several historic sites were partially excavated to collect data for reconstruction, under contract with the State of Texas. Included were:

Ft. Lancaster, a mid-19th century U. S. Army post on the Pecos River;

San Saba, a mid-18th century Spanish mission and presidio;

Ft. Leaton, a 19th century frontier site on the Rio Grande in western Texas;

Washington-on-the-Brazos, center of Stephen F. Austin's colony and site of Texas' declaration on Independence from Mexico in 1836.

Typology of English and American Ceramics, 1968, 1973. I pursued this study for six months in residence at the Smithsonian Institution in Washington in 1968 under Smithsonian sponsorship, and in the fall of 1973 while on sabbatical at Illinois State.

Constitution Island, New York, 1971-72. Exploratory excavations were carried out at a Revolutionary War military site at the U. S. Military Academy, West Point, under contract with the West Point Museum.

Illinois Historic Sites Survey, 1971-75. This archeological survey of the Mackinaw and central Illinois River valleys was funded by the National HSS program, through the Illinois Department of Conservation.

Improvement of Social Science Teaching, 1970-71. I collaborated in this interdisciplinary study (funded by a grant from the U. S. Office of Education) which explored methods of improving the teaching of social sciences in elementary schools.

The Noble-Wieting Site, Illinois, 1972, 1976. Excavations at this Upper Mississippian site were conducted as ISU archeological field schools.

Cahokia Courthouse Historic Site, Illinois, 1976. Preconstruction excavation of a building site was carried out under contract with the Illinois Department of Conservation.

Archeological Survey of Starved Rock and Matthiessen State Parks, Illinois, 1976. This was carried out under contract with the Illinois Department of Conservation.

Archeological Survey of FAP Highway Project No. 412, Illinois 1977. This preconstruction survey was funded by the Illinois Department of Transportation.

Miscellaneous Research. In addition to the funded projects listed above, I have done a considerable amount of personal research in archeological method and theory, typology, ethnohistory, and statistics, as is evident from publication titles appearing later in this resume'.

EDITORIAL EXPERIENCE

I have served as Editor of the Archaeology Series of the University of Texas (1959-68) and of the Bulletin of the Texas Archeological Society (1965-67). I also edited the scores of technical reports submitted to funding agencies in connection with research projects listed above.

PAPERS PRESENTED AT PROFESSIONAL MEETINGS

Over the past 25 years I have read dozens of papers at professional meetings, including annual meetings of the Society for American Archaeology, the Society for Historical Archaeology, the American Studies Associations, the South-eastern Archeological Conference, the Plains Archeological Conference, the Southwestern Historical Association, the Texas Academy of Sciences, the Texas Archeological Society, and the Caddoan Archeological Conference.

Miscellaneous

Member of 1963 scientific boating expedition through Santa Elena and other canyons of the Rio Grande, featured on Educational Television film, The River.

Consultant for permanent exhibits on Texas prehistory, Institute of Texan Cultures, HemisFair Exposition, San Antonio, 1968.

Member of Illinois Advisory Council on Historic Preservation, 1977-78. The Council recommends Illinois Sites for nomination to the National Register of Historic Places and to the Illinois Register of Historic Places, and advises the State Historic Preservation Officer on matters related to Historic Preservation.

HONORS

Honorary Research Associate, Smithsonian Institution, Division of Cultural History.

Fellow, American Association for the Advancement of Science

Fellow, American Anthropological Association

Fellow, Texas Archeological Society

1972 Spring Lecturer, College of Arts and Sciences, Illinois State University.

MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Anthropological Association

American Association for the Advancement of Science

American Association of University Professors

American Society for Conservation Archaeology

Archaeological Institute of America

Association for Field Archaeology

Illinois Archaeological Survey

Society for American Archaeology

Society for Historical Archaeology

Society of Professional Archeologists

Texas Archeological Society

Council of Texas Archeologists

ELECTED OFFICES IN PROFESSIONAL SOCIETIES

American Society for Conservation Archaeology

Vice President, 1975-76
Director, 1976-77

Illinois Archaeological Survey

President, 1972-73

Society for Historical Archaeology

Vice President, 1967
President, 1968

Society of Professional Archeologists

President, 1976-77

Texas Archeological Society

Secretary-Treasurer, 1956-57
President, 1957-58
Editor, 1965-67

COMMITTEE APPOINTMENTS, PROFESSIONAL SOCIETIES

American Association for the Advancement of Science

Committee for Arid Land Studies, 1968-70

American Society for Conservation Archaeology

Steering Committee, 1974-75

Illinois Archaeological Survey

Committee on Professional Standards and Certification, 1974-75
Quality Control Committee, 1975
Cultural Resources Committee, 1976-77

Society for American Archaeology

Committee on Professional Standards and Ethics, 1959
Committee for Public Understanding of Archaeology, 1968-70
Committee on Professional Certification, 1974-75
Chaired Interim Committee on Professional Standards, 1976

Society for Historical Archaeology

Chaired Nominations and Elections Committee, 1970
Chaired Committee on Professional Standards, 1973-75

Pan-American Institute of Geography and History

Committee on Archaeology, 1977-81

Society of Professional Archeologists

Chaired Nominating Committee, 1979
Elected to Board of Directors, 1980-82

McLean County Historical Society

Elected to Board of Directors, 1980

PUBLICATIONS

Books and Monographs

1954 (co-author, with Dee Ann Suhm and Alex D. Krieger) An Introductory Handbook of Texas Archeology. Issued as Vol. 25 of the Bulletin of the Texas Archeological Society. 582 pp.

1958 (co-editor, with E. Mott Davis and Henry F. Sturgis) A Review of Texas Archeology: Part One. Issued as Vol. 29 of the Bulletin of the Texas Archeological Society. 254 pp.

1959 (co-author, with Curtis D. Tunnell) The Harroun Site: A Fulton Aspect Component of the Caddoan Area, Upshur County, Texas. Department of Anthropology, The University of Texas, Archaeological Series, No. 2. 63 pp.

1961 (co-author, with Lathel F. Duffield) The Pearson Site: A Historic Indian Site at Iron Bridge Reservoir, Rains County, Texas. Ibid., No. 4. 83 pp.

1962 The Kyle Site: A Stratified Central Texas Aspect Site in Hill County, Texas. Ibib., No. 5. 115 pp.

(co-editor, Dee Ann Suhm) Handbook of Texas Archeology: Type Descriptions. Special Publications of the Texas Archeological Society, No. 1; Bulletin of the Texas Memorial Museum, No. 4. 299 pp.

1965 (co-author, with John P. Nunley and Lathel F. Duffield) Excavations at Amistad Reservoir, 1962 Season. Miscellaneous Paper of the Texas Archeological Salvage Project, No. 3. 129 pp.

1967 (co-editor, with Robert E. Bell and W. W. Newcomb) A Pilot Study of Wichita Indian Archeology and Ethnohistory. Southern Methodist University. 401 pp.

(editor) The Gilbert Site. Issued as Vol. 37 of the Bulletin of the Texas Archeological Society. 264 pp.

1972 Archeological Excavations at Constitution Island, 1971. U. S. Military Academy, West Point. 140 pp.

1973 Archaeological Explorations at Signal Hill, Newfoundland, 1965-1966. Occasional Papers in Archaeology and History, No. 7. National Historic Sites Service, National and Historic Parks Branch, Ottawa. 127 pp.

1974 (co-author, with Raymond L. Schmitt) Trick Taking Potential. JETT Publishing Co. 66 pp.

1975 The Use and Misuse of Random Sampling in Archeology. JETT Publishing Co. 27 pp.

Articles

1952 (co-author, with E. O. Miller) Archeological Excavations at the Belton Reservoir. Bulletin of the Texas Archeological Society, Vol. 23, pp. 168-217

The River Basin Surveys Archeological Salvage Program in Texas. Texas Journal of Science, Vol. 4, No. 2, pp. 131-138.

1953 Excavations at the Blum Rockshelter. Bulletin of the Texas Archeological Society, Vol. 24, pp. 189-207.

The River Basin Surveys: Recent Archeological Investigations in Texas, Arkansas, and Kansas. Texas Journal of Science, Vol. 5, No. 3, pp. 342-347.

1957 (co-author, with John L. Cotter) Historic Site Archaeology at Jamestown. American Antiquity, Vol. 22, No. 4, pp. 387-389.

1958 (co-author, with LeRoy Johnson, Jr.) The Tawakoni-Yscanis Village of 1760: A Study in Archeological Site Identification. Texas Journal of Science, Vol. 10, No. 4, pp 405-422.

Ceramics from Jamestown. In Archeological Excavations at Jamestown, Virginia, by John L. Cotter. National Park Service, Archeological Series, No. 4, pp. 201-212.

1959 Archeologists Add New Data on Texas' Past. Engineering-Science News, Vol. 7, No. 1. pp. 1-4.

1961 Excavations at Texarkana Reservoir, Sulphur River, Texas. Smithsonian Institution, Bureau of American Ehtnology Bulletin, No. 179, pp. 1-78.

Relationships Between the Caddoan Area and Texas. Bulletin of the Texas Archeological Society, Vol. 31, pp. 65-70.

1964 (co-author, with Cyrus N. Ray) The W. H. Watson Site; A Historic Indian Burial in Fisher County, Texas. Ibid., Vol. 35, pp. 127-141.

1967 Critique of Dollar's "Some Thoughts on Theory and Method in Historical Archaeology". Papers of the Conference on Historic Site Archaeology, Vol. 2, Part 2, pp 80-93.

1968 Observations on the Scope of Historical Archaeology. Historical Archaeology, Vol. 2, pp 1-3.

1970 Documentary Evidence of Indian Occupation at the Stansbury Site. Bulletin of the Texas Archeological Society, Vol. 41, pp. 277-286.

Technical Reports

1952 (co-author, with E. O. Miller and E. H. Moorman) Archeological Survey of the Ferrells Bridge Reservoir. (mimeographed) Smithsonian Institution.

Appraisal of the Archeological and Paleontological Resources of the Colorado City Reservoir. (mimeographed) Smithsonian Institution.

(co-author, with E. H. Moorman) Appraisal of the Archeological Resources of Cooper Reservoir. (mimeographed) Smithsonian Institution.

1953 (co-author, with E. H. Moorman) Appraisal of the Archeological Resources of Paint Creek Reservoir. (mimeographed) Smithsonian Institution. 5 pp.

(co-author, with E. H. Moorman) Appraisal of the Archeological Resources of Oak Creek Reservoir. (mimeographed) Smithsonian Institution. 5 pp.

1954 Appraisal of the Archeological Resources of Millwood Reservoir. (mimeographed) National Park Service. 5 pp.

Appraisal of the Archeological Resources of De Cordova Bend, Inspiration Point, and Turkey Creek Reservoirs. (mimeographed) National Park Service. 18 pp.

1954 Appraisal of the Archeological Resources of Rockland Reservoir. (mimeographed) National Park Service. 11 pp.

1955 Archeological Exploration of Earthworks in the French Artillery Park Area, Yorktown Battlefield. Report on file at Colonial National Historical Park, Virginia. 12 pp.

1956 Archeological Study of British and Confederate Earthworks on the Southeast Side of Yorktown. Report on file at Colonial National Historical Park, Virginia. 15 pp.

Archeological Explorations at Redoubt No. 10, Yorktown Battlefield. Report on file at Colonial National Historical Park, Virginia. 12 pp.

1960 Appraisal of the Archeological Resources of Farmers Creek Reservoir. Report to the National Park Service.

(co-aurthor, with Curtis Tunnell) Appraisal of the Archeological Resources of Proctor Reservoir. (mimeographed) Texas Archeological Salvage Project, Austin. 32 pp.

1966 Archeolgocial Exploration at Fort Lancaster, 1966: A Preliminary Report. Texas State Building Commission, Archeological Program, Report No. 4. 28 pp.

Preliminary Report of Excavations at Signal Hill National Historical Park, St. John's, Newfoundland, 1965 Season. Report on file at Canadian Historic Sites Service, Ottawa. 29 pp.

1967 Preliminary Report of Excavations at Signal Hill National Historical Park, Newfoundland, 1966 Season. Report on file at Canadian Historic Sites Service, Ottawa. 23 pp.

1978 The Joachim deBrum House, Likiep, Marshall Islands. (co-author, with Juliet C. Jelks) Report prepared for the High Commissioner, Trust Territory of the Pacific Islands. 40 pp.

Revival of a Legend: the Restoration of the deBrum House. Glimpses of Micronesia and the Western Pacific, Vol. 18, No. 4, pp. 52-55. (co-author Judy Jelks)

The Diablo Range. Chapter in Chronologies in New World Archaeology. Academic Press. 35 pp.

Miscellaneous

1951 Manual for Beginners in Central Texas Archeology. (mimeographed) Smithsonian Institution. 20 pp.

1965 The Archeology of McGee Bend Reservoir, Texas. Ph.D. dissertation, University of Texas at Austin. 288 pp.

1966 Review of An Introduction to Prehistoric Archeology, by Frank Hole and Robert F. Heizer. American Antiquity, Vol. 31, No. 5, pp. 584-85.

1972 Comments on Stanley South's Paper: "Evolution and Horizon as Revealed in Ceramic Analysis in Historical Archaeology". The Conference on Historic Site Archaeology, Papers 1971. University of South Carolina. pp. 175-78.

Review of The Lansanen Site, Charles E. Cleland, ed. Michigan Archaeologist, Vol. 18, No. 3, pp. 169-173.

Script for American Indians of the Southeast, a series of six filmstrips. Coronet Filmstrips, Chicago.

In Press

Section on the Caddo for inclusion in Handbook of North American Indians, being published by the Smithsonian Institution. (Ms. submitted in August 1972; publication estimated ca. 1981)

ADDENDA: Recent Professional Activities (1977-79)

Served on ad hoc archeological advisory committee which advised the Interagency Archeological Services Division, U. S. Department of the Interior, on reorganizational planning (1977)

Conducted an investigation for the Society of Professional Archeologists into charges, published in the Kansas City Times, of administrative improprieties on part of certain contract archeologists at the University of Missouri, Columbia (1977)

Research projects included:

Archeological Study and Stabilization of the Joachim deBrum Historic Site, Likiep Atoll, Marshall Islands (funded by the Trust Territory of the Pacific Islands).

Funded by the Illinois Department of Conservation: Archeological Investigations at Vandalia State Historic Site (1977); Archeological Investigations at Shawneetown Bank Historic Site (1977); Search for Archeological Remains of LaSalle's Fort Crevecoeur.

Funded by the Illinois Department of Transportation: Archeological Testing of Sites in the FAP Highway Project No. 409; Archeological Testing of Sites in the FAI Highway Project No. 270; Archeological Testing of Sites in the FAP Highway Project No. 413; Archeological Testing of the Camaro Mound Group; Archeological Testing of the Thompson Causeway Site; survey and testing of sites in areas to be affected by about 40 small highway construction projects.

Funded by the U. S. Department of the Interior: Historical Geographical Documentary Study of Pine Ford Lake, Missouri.

Funded by the U. S. Army Corps of Engineers: Archeological Survey at Shelbyville Reservoir; Archeological Survey of Arsenal Island.

CURRICULM VITAE

DAVID LEE CARLSON

Present Address: Department of Sociology, Anthropology, And Social Work
Illinois State University
Normal, IL 61761

Phone Numbers: Office (309)-438-7533
Home (309)-454-2085

Date and Place Birth: 30 September 1952; Columbus, Ohio

Marital Status: Single

Education: Wake Forest University: B.A. Anthropology 1974
Northwestern University: M.A. Anthropology, 1975; Ph.D. Anthropology, 1979

Thesis and Dissertation: Population Growth, Pressure, and Control: Demographic Explanation in Archeology. Master's Qualifying Paper.

Mobility Strategies and Hunter-Gatherers in the Middle Archaic: An Example from the Koster Site in the Lower Illinois Valley. Ph.D. Dissertation.

Honors and Scholarships: Wake Forest University, Carswell Scholarship, 1970-74.
Phi Beta Kappa, 1974
Northwestern University Fellowship, 1974-75
National Science Foundation Fellowship, 1975-78

Employment History: Assistant Professor of Anthropology
Director, Prehistoric Division of Midwestern Archeological Research Center,
Illinois State University,
August 1978 to Present

Research and Field Experience: September 1972-May 1973. Part-time lab assistant, Wake Forest, Museum of Man, J.N. Woodall, Director.

June-July 1973. Excavator, Petit Site, Ramah, NM, J.N. Woodall, Director.

August 1973. Excavator, Bethabara, NC, Jacqueline Fehon, Director.

September-December 1973, Part-time lab assistant, Wake Forest, Museum of Man, J.N. Woodall, Director.

June 1974. Field Supervisor, Duke Power Salvage Project, NC, J.N. Woodall, Director.

July-August 1974. Field Supervisor, Petit Site, Ramah, NM, J.N. Woodall, Director.

June-August 1975. Field Supervisor, Koster Site, Kampsville, IL, Gail Houart, Director.

June-August 1976. Field Supervisor, Koster Site, Kampsville, IL, Michael Wiant, Director.

June-August 1977. Lab Assistant, Computer Lab, Kampsville, IL, R.K. Vierra, Director.

August 1978-October 1979. Field Director, FAI-270/FAP-413 Survey and Testing Project, Collinsville, IL, E.B. Jelks, Principal Investigator.

November 1979. Field Director, Camaro Mound Group, Jo Daviess County, IL. E.B. Jelks, Principal Investigator.

December 1979. Field Director, Thomson Causeway Mound, Carroll County, IL. E.B. Jelks Principal Investigator.

April 1980-September 1980. Principal Investigator and Co-Principal Investigator (with E.B. Jelks), Testing and Excavation at 8 Borrow Pits in the American Bottom, IL.

September-October 1980. Co-Principal Investigator (with E.B. Jelks), Survey of the Kaskaskia River branch of Lake Shelbyville, Moultrie County, IL for the U.S. Army Corps of Engineers, St. Louis District.

February-March 1981. Co-Principal Investigator (with E.B. Jelks), Survey of Level Alignments in the Lower Rock River for the U.S. Army Corps of Engineers, Rock Island District.

March 1981--. Co-Principal Investigator (with E.B. Jelks), Survey of Black Hawk State Historic Site for the Illinois Department of Conservation.

March 1981--. Co-Principal Investigator (with E.B. Jelks), Survey of Tapley Woods Conservation Area, Apple River Canyon State Park, Lake Le-Aqua-Na State Park for the Illinois Department of Conservation.

April 1981--. Co-Principal Investigator (with E.B. Jelks), Survey of Illinois Beach State Park for the Illinois Department of Conservation.

April 1981--. Co-Principal Investigator (with E.B. Jelks), Survey of Pool 16 of the Mississippi River for the U.S. Army Corps of Engineers, Rock Island District.

Professional Societies:

American Anthropological Association
Society of American Archaeology
Society of Professional Archaeologists
Illinois Archaeological Survey, Quality Control Committee.

Publications:

1981. Factor Analysis: Random Data and Patterned Results, with R.K. Vierra. American Antiquity 46(2):272-283.

Book Reviews and Comments:

1980. Review of Emilio Moran's Human Adaptability. Human Ecology 8(4):410-411.

1980. Comment on David Yesner's "Maritime Hunter-Gathers: Ecology and Prehistory". Current Anthropology 21(6):736.

Papers in Preparation:

Mobility Strategies and Site Structure at Koster.

Revision of dissertation for Northwestern University Archeological Program Monographs.

Ceramic Dating: Some Refinements and Their Results.

Resource Selection: Economic Versus Ecclogical Models. Paper to be given at the S.A.A. Meetings in San Diego.

Contract Reports:

1980 Report on Excavation at the Thin Man Site (S-647) on FAI Route 270, St. Clair County, IL (with Charles Smith).

1980 Report on Phase I Reconnaissance for the Improvement of the Existing Interchange of I-270 with Illinois Route 157, Madison County, IL (with David Shaw).

1980 Report on Phase I Reconnaissance for the Proposed SIU-E Connector Road Madison County, Illinois (with Mark Esarey).

In prep. Report on Phase III Excavation at the Camaro Mound Group (JD-III) on FA Route 18, Jo Daviess County, IL (with Mark Esarey).

In prep. Report on Phase II Testing at the Thomson Causeway Site (CA-11) on FA Route 18, Carroll County, IL (with Mark Esarey).

In prep. Report on Phase II Testing on FAP 409 in St. Clair, Clinton, and Marion Counties, IL (Editor).

In prep. Report on Phase II Testing of Sites on FAP 413 in Madison County, IL.

In prep. Report on Phase II Testing of Sites on FAI 270 in Madison County, IL.

In prep. Reports on various Borrow Pits involving testing and excavation of eight sites.

Papers Given and Symposia Organzied:

Problems of Plowzone Sites in Illinois, Chairperson. Organized with E.B. Jelks, Illinois State University, April 6, 1979.

Koster: The Early and Middle Archaic Horizons, Chairperson. Organized with R.K. Vierra. Society for American Archaeology. 44th Annual Meeting in Vancouver, British Columbia, April 23-25, 1979.

Mobility Strategies and Site Structure at Koster. Paper presented at the Society for American Archaeology, 44th Annual Meeting in Vancouver, British Columbia, April 23-25, 1979.

A Refinement of the South Mean Ceramic Date Formula, with R.C. Sonderman. Society for Historical Archaeology. 13th Annual Meeting in Albuquerque, New Mexico, January 8-11, 1980.

Annual workshop of the Illinois Archaeological Survey, November 8, 1980. Symposia on Mississippian Settlement Patterns, Middle Woodland sites in Illinois and Historic Sites Archaeology. Organized with Fred Lange.

Courses Taught:

Midwestern Archeology
Introduction to Archeology (with Fred Lange)
Archeological Field School (with Fred Lange and E.B. Jelks)

Major Interests:

Prehistory of Eastern North America
Method and Theory (Quantitative Methods)
Conservation Archaeology
Hunter-Gatherers
Ecological Anthropology
Evolutionary Anthropology

References:

James A. Brown
Department of Anthropology
Northwestern University
2006 Sheridan Road
Evanston, IL 60201
312/492-5402

Edward B. Jelks
Department of Sociology, Anthropology, and Social Work
Illinois State University
Normal, IL.
309/438-2271

Stuart Struever
Department of Anthropology
Northwestern University
2006 Sheridan Road
Evanston, IL 60201
312/492-5402

Robert K. Vierra
Department of Anthropology
Northwestern University
2006 Sheridan Road
Evanston, IL 60201
312/492-5402